Enterprise IP Solutions

OfficeServ 7200

General Description

SAMSUNG

Publication Information

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SAMSUNG ELECTRONICS

EU Declaration of Conformity (RTTE)

Samsung Electronics Co., Ltd.

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(factory name, address)

declare under our sole responsibility that the product

Digital Keyphone System "OfficeServ 7200" / IP MODEM "LXM-300Q"

to which this declaration relates is in conformity with

RTTE Directive 1999/5/EC (Annex II)
Low Voltage Directive 73/23/EEC:93/68/EEC
EMC Directive 89/336/EEC:92/31/EEC

CE

By application of the following standards

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Intended Use

This telephone system is intended to provide the user with voice communication between the system extensions and connection to the public switched telephone network by digital or analogue links.

The telephone system may be provided with the ability to communicate with local computer networks to provide CTI functions and features. In this case, it is capable of passing information to the computer network via a specified link.

The system is powered by mains voltage and can optionally be powered by batteries. Details of all connections and power arrangements are provided in the instructions for use. It should not be used in any other way.

INTRODUCTION

Purpose

This guide describes the Samsung OfficeServ 7200 keyphone system including its hardware configurations, specifications and functions.

Guide Content and Organization

This guide consists of four chapters:

CHAPTER 1. Introduction to the OfficeServ 7200

Describes the features and functions of the OfficeServ 7200 and provides an overview of the system architecture, interfaces and programming.

CHAPTER 2. OfficeServ 7200 Hardware

Describes the OfficeServ 7200 hardware including chassis configuration and the functions and configurations of the functional modules. A variety of terminals, wireless LAN equipment and additional equipment that can be connected with the OfficeServ 7200 are also described.

CHAPTER 3. OfficeServ 7200 Specifications

Provides information on the system capacity, electrical specifications, power specifications, rings and tones, and equipment specifications.

CHAPTER 4. OfficeServ 7200 Functions

Describes the functions related to calls, VoIP, data, UMS and the web/system management provided by the OfficeServ 7200.

ABBREVIATIONS

Explains the abbreviations and acronyms used in the guide.

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Conventions

The following special paragraphs are used in this guide.

WARNING

Provides information or instructions you should follow in order to avoid personal injury or fatality.

CAUTION

Provides information or instructions you should follow in order to avoid a service failure or damage to the system.

CHECKPOINT

Provides you with checkpoints for ensuring stable system operation.

NOTE

Indicates additional information as a reference.

References

Samsung OfficeServ 7200 Installation Guide

This guide provides installation procedures for the OfficeServ 7200 keyphone system.

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ABBREVIATIONS

A ~ E Abbreviations1
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CHAPTER 1

Introduction to the OfficeServ 7200

This chapter describes the features and functions of the OfficeServ 7200 including the system architecture, interfaces and programming.

1 Introduction to the System

The OfficeServ 7200 is a communications system most suitable for small offices where less than 50 subscriber lines are used. It allows phone users to receive voice, data and Internet services, which means that the system makes voice calls and sends/receives data using data networks. Users can easily make use of a variety of phone functions and applications on various platforms such as digital phones, IP phones, mobile phones and PC servers.

1.1 Major Functions

The major functions and features of the OfficeServ 7200 are described below.

Integrated Communication Environment

The OfficeServ 7200 makes voice calls and sends/receives data using LAN / WAN modules. Integrated wired/wireless devices (phones, PCs, servers, mobile phones and peripherals) are used for communication.

Next-generation Platform

The OfficeServ 7200 uses an IP-based feature server to provide an IP solution which integrates the functions of mail servers, Session Initiation Protocol (SIP) servers, and Voice over IP Unified Messaging Service (VoIP UMS).

The IP-based feature server is a Linux platform and can continuously add feature server modules to be provided in the future. Examples of the feature servers include the mobile roaming server and the Authentication, Authorization and Accounting (AAA) server.

Higher Quality IP Phone

The OfficeServ 7200 ensures the Quality of Service (QoS) of the voice calls depending on the priorities and grouping of data and voice packets.

- Layer 2 QoS : Priority Processing (802.1p), VLAN (802.1q)
- Layer 3 QoS : Class Based Queuing (CBQ), RTP Priority Queuing, or the on-demand management of the bandwidth Wide Area Network (WAN)

WAN/LAN Functions

The WAN and LAN interface modules are installed in the OfficeServ 7200; thus, data can be sent/received via the 10Base-T/100Base-Tx interface in both the external Internet and the internal Intranet without any data equipment.

Wireless LAN Services

The OfficeServ 7200 offers a wireless LAN solution for both wired and wireless services in offices. The OfficeServ 7200 uses a combined Access Point (AP), which offers services by separating the data from voice, and supports handoff and QoS. Because the OfficeServ 7200 uses a wireless LAN base station, it allows users to make wired/wireless voice/data communications or access the Internet without establishing the LAN.

Also, an efficient and convenient working environment can be established at any time or in any place because sophisticated mobile stations are used for the OfficeServ 7200.

Text-To-Speech (TTS) Responses

The OfficeServ 7200 converts text messages such as e-mails to voice messages and allows users to listen to their messages through phones. Also, it recognizes the voices and responds to them.

Mail Server and Instant Messaging

The OfficeServ 7200 integrates voice messages and e-mails to function as an e-mail server which converts the integrated messages according to users' needs and resends them, and sends/receives instant messages.

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Application Solutions

The OfficeServ 7200 offers a variety of application solutions such as OfficeServ News, OfficeServ EasySet, Internet Call Center, R-NMS, internal module-type voice mail solutions, integrated facsimile servers, and digital integrated recording systems.

- 'Integrated' means that the OfficeServ 7200 system and the external server perform a single integrated function.
- For information on how to use each application, refer to the relevant User's Guide for each.

Easy Installation and Expandability

The OfficeServ 7200 is easily installed: the basic chassis and expansion chassis are mounted on a 19-inch rack. Multiple service modules can be installed in universal chassis slots.

1.2 System Architecture

The OfficeServ 7200 is configured with a basic chassis and expansion chassis mounted on a 19-inch rack. The OfficeServ feature server is mounted on an external Linux server.

The Main Control Processor (MCP) is installed in the basic chassis and manages the entire system. It performs switching, processes signals and manages the phones. The expansion Line Control Processor (LCP), the sub-control part, is installed in the expansion chassis: it controls the modules and sends/receives data to/from the MCP. The other components are various interface modules, power modules and fans.

The service configuration of the OfficeServ 7200 is shown below:

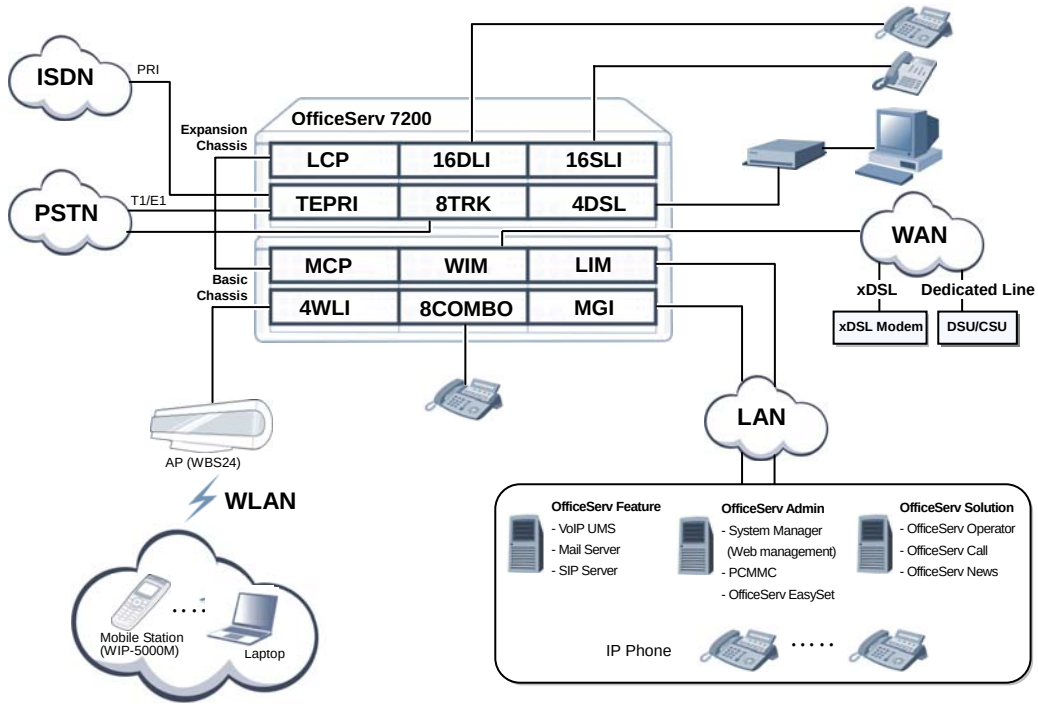

Figure 1.1 Service Structure of the OfficeServ 7200

Voice Trunk Line Part

The voice trunk line part is configured with digital trunk lines and analogue trunk lines. The TEPRI modules interface the E1, T1, or PRI digital trunk lines and send/receive voice data through the trunk lines**.** They transmit voice data at 64 kbps per channel. The 4BRI modules interface with BRI T or S points and transmit voice data at 64 kbps per channel. The 8TRK modules perform Polarity Reversal Signalling (PRS), Metering Pulse Detection (MPD) and Caller ID (CID) detection in a module and send / receive voice data via analogue trunk lines. Data is transmitted at 64 kbps per line.

Voice Station Part

The voice station part is configured with a Digital Line Interface (DLI) which interfaces digital voice stations, and a Subscriber Line Interface (SLI) which interfaces analogue voice stations. Multiple DLI and SLI modules can be mounted in any slots of the main or expansion chassis depending on the number of analogue/digital voice stations. 16DLI and 8DLI are Digital Line Interface modules. 16SLI, 16MWSLI and 8SLI are analogue Subscriber Line Interface module. In addition, there is a combination type 8COMBO which contains interface circuits for analogue and digital stations.

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Data Transmitting Part

The data module is configured with the WIM, a WAN interface module, and the LIM, a LAN interface module. The WIM module sends and receives data to and from the external Internet and provides ports for connecting the internal network with a variety of external interfaces. The LIM module sends and receives data to and from the internal Intranet and provides a 10Base-T/100Base-Tx interface. It also functions as a layer 2 switch.

The 4DSL module offers services to data subscribers up to 1 km away from the internal Intranet. Subscribers can use the Ethernet service within a transmission distance of 1.2 km.

Voice Application Service Part

The voice application module consists of the VoIP that transmits the voice to the data network and the WLAN that transmits the voice wirelessly. The MGI module offers the VoIP function by converting voice into data. If used, the 4WLI module uses a Digital Adaptor for Subscriber Loop (DASL) to connect to the wireless BTS (Combo type) and sends/receives voice to/from the phone system and wireless BTS. The 4WLI accommodates up to four BTS (Combo) and 48 subscribers. If not used, the wireless BTS (Basic type) is connected to the LAN only and accommodates 40 BTS and 120 subscribers

Application Configuration

The OfficeServ 7200 has a commercial server on a Linux platform outside of the OfficeServ 7200 chassis which provides the following application software.

- Mail server
- SIP server
- VoIP-UMS

OfficeServ Solution and OfficeServ Admin have separate servers.

- OfficeServ Solution: CTI, OfficeServ Operator
- OfficeServ Admin: Web Management, PCMMC, OfficeServ EasySet, System Manager

2 Interfaces

This section describes the interfaces between the sub-modules of the OfficeServ 7200 and those between the VoIP elements.

2.1 Interfaces between the Sub-Modules

Table 1.1 Interfaces between the Sub-Modules

Type	Classification	Interface
LIM Interface	Physical Connection	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-Tx
	Connector Type	RJ-45 16 port
WIM Interface	Physical Connection	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-Tx, V.35
	Connector Type	RJ-45, serial 26-pin connector (non-standard cable)
	Access Protocol	PPPoE, PPP, DHCP, HDLC, Frame Relay
PSTN Interface	Physical Connection	T1, E1, Foreign Exchange Office (FXO)
	Connector Type	RJ-45
	Access Protocol	T1, E1, Loop Start
ISDN Interface	Physical Connection	ISDN PRI, ISDN BRI
	Connector Type	RJ-45
	Access Protocol	ISDN PRI, ISDN BRI
xDSL/Cable Modem Interface	Physical Connection	IEEE 802.3u 100Base-Tx Ethernet
	Connector Type	RJ-45
	Access Protocol	PPPoE, DHCP
Voice Terminal Inter-face	Analogue Phone	Foreign Exchange Station (FXS)
	Digital Phone	Samsung digital phone
	Wireless LAN Access Point AP)	802.11b, WBS24 (Samsung wireless LAN AP)
Interface between the call server and data server	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	UDP IPC
Interface between the call server and SIP server	Physical Connection	100Base-Tx Ethernet
	Signal Processing	SIP
	Access Protocol	User Agent (UA) to UA
Interface between the call server and system manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	TCP, UDP IPC

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Type	Classification	Interface
Interface between the data server and feature manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	DHCP
Interface between the data server and system manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	TCP, UDP IPC
Interface between the feature server and system manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	TCP, UDP IPC

2.2 Interfaces between the VoIP Elements

The OfficeServ 7200 provides a variety of VoIP interfaces:

- VoIP networking
- H.323 VoIP gateway
- SIP VoIP gateway
- SIP server
- System SIP User Agent (UA)
- IP phones
- Standard SIP phones

The interface standards between the VoIP elements based on the signal processing are as follows:

- Proprietary TCP IPC
- SIP UA-to-UA
- UA-to-Server

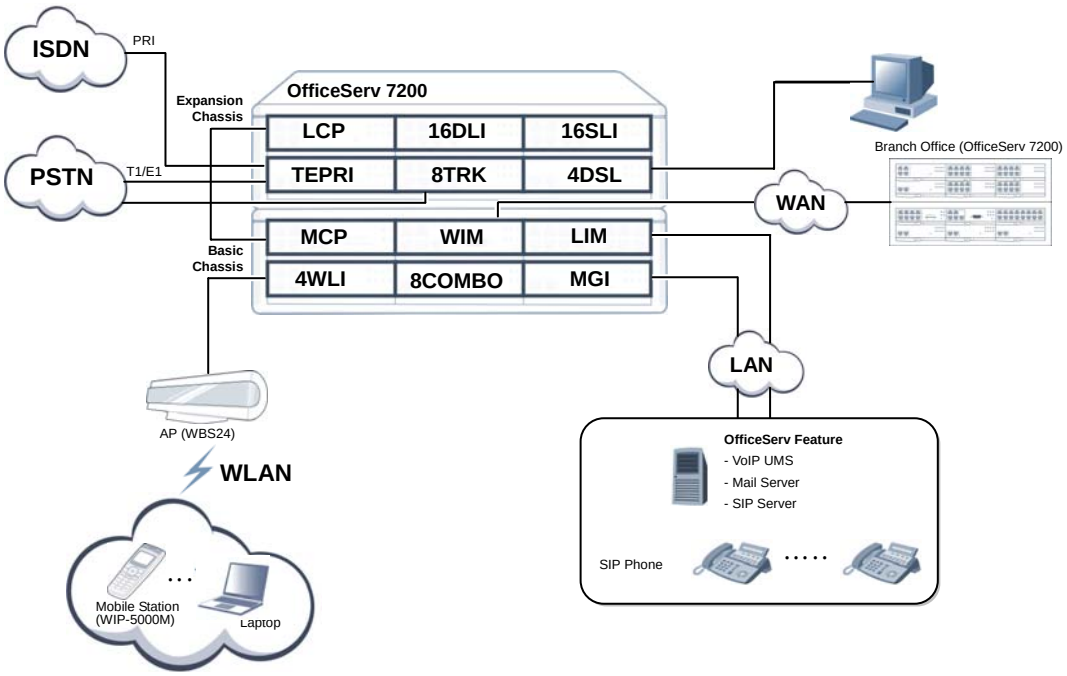

Figure 1.2 Interfaces between the SIP Components

3 Programming

MMC programs are used to change the data used for system settings and operate at three levels: technician (or system) level, customer level, and station (subscriber) level. Subscribers can only program MMCs accessible at station level. A password is required for technician-level and customer-level programming but not for subscriber programming.

Technician-Level Programming

All MMCs can be programmed at this level. Programming can be done using any of the display phones in the OfficeServ system.

Customer-Level Programming

A customer can only program the MMCs specified in MMC 802 (Customer Access MMC Number). Programming can be done using any of the display phones in system.

Subscriber-Level Programming

Programming can be done only for an individual subscriber's phone.

Refer to your *Samsung OfficeServ 7200 Programming Guide* for details.

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CHAPTER 2

OfficeServ 7200Hardware

This chapter describes the hardware features, chassis configurations and module functions/configurations for the OfficeServ 7200 system. It also describes the terminals, wireless LAN equipment and additional equipment available to the system.

Hardware is installed as described in the *Samsung OfficeServ 7200 Installation Guide* provided with your system.

1 Hardware Features

The features of the OfficeServ 7200 hardware are described.

Reliability

The materials and components comprising the OfficeServ 7200 hardware are robust and reliable. They fully meet the mechanical and electrical standards needed for a communications system.

- The OfficeServ 7200 metal chassis complies with the industry standards (19 inches) and is a robust welded assembly.
- The hardware does not generate poisonous or corrosive gases which might do harm to the human body or affect system operation.
- The hardware is made of materials that meet Electromagnetic Compliance (EMC) Standards.
- The hardware has a fail-safe mechanism to prevent the system from being damaged due to an over-voltage.

Modularity

The functions of the OfficeServ 7200 hardware are modularized.

- Capacity can be expanded or functions can be changed in each module without stopping services for existing subscribers.
- Each module can be easily installed or removed (plug in or out).

Maintenance

The OfficeServ 7200 hardware is designed to be maintained with ease and safety.

- The 19-inch rack is designed to maintain sufficient strength.
- The installing/maintenance technician can connect cables easily using external ports on the front panel.
- The front of each module has an LED that indicates failure and operational status so that system failures are easily identified.
- The back of the rack has a ground hole to which a wrist strap for preventing static electricity can be connected.
- The OfficeServ 7200 hardware is designed to prevent electronic devices from being damaged while installation or maintenance is being carried out.

Fire Resistance and Heat Processing

The OfficeServ 7200 hardware is made of fire-resistant materials and components. The OfficeServ 7200 hardware is designed not to affect system performance due to heat generated from inside of the system.

- Heat generated by a component is blocked in order not to affect temperature-sensitive components.
- Two 80 mm fans for cooling are installed.
- Components installed in the modules are located based on heat distribution.

2 Chassis Configuration

The OfficeServ 7200 consists of two chassis (a basic and an expansion chassis) mounted on a 19-inch rack and a feature server that operates externally. The MCP, the main control processor, is installed in the basic chassis and manages the entire system, performing switching and signal processing, and managing subscriber terminals. The LCP, the minor control processor, is installed in the expansion chassis and controls the line module and sends/receives information to/from the MCP. The chassis also include line modules, power, and cooling fans.

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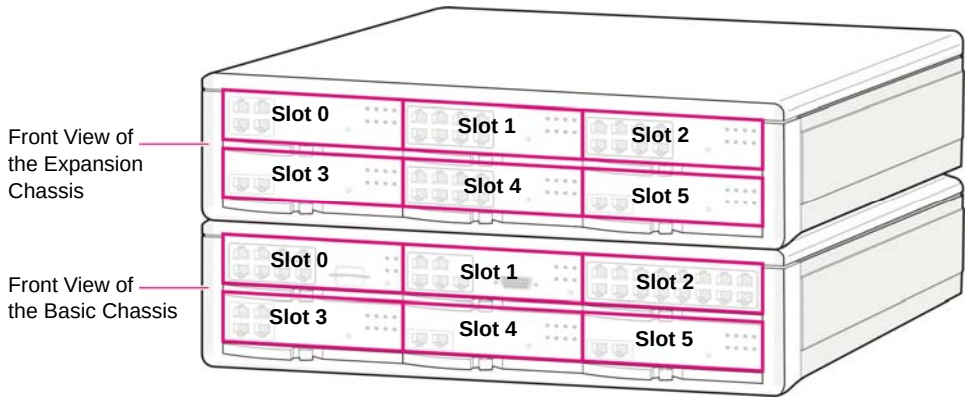

Figure 2.1 OfficeServ 7200 Chassis Configuration

Table 2.1 Modules that can be Mounted in the Slots

Chassis	Slot	Mountable Modules
Basic Chassis (OfficeServ Access)	Slot 0	MCP only
	Slot 1	All modules except for MCP, LCP, TEPRI, and LIM
	Slot 2	All modules except for MCP, LCP, TEPRI, and WIM
	Slot 3	All modules except for MCP, LCP, and WIM
	Slot 4	
	Slot 5	
Expansion Chassis (OfficeServ Expansion)	Slot 0	LCP only
	Slot 1	All modules except for MCP, LCP, TEPRI, and LIM.
	Slot 2	
	Slot 3	All modules except for MCP, LCP, and WIM
	Slot 4	All modules except for MCP, LCP, TEPRI, and WIM
	Slot 5	

- The WIM module can be mounted only in Slot 1 of the basic and expansion chassis.
- The TEPRI module can be mounted only in Slots 3, 4, and 5 of the basic chassis and Slot 3 of the expansion chassis.
- The LIM module cannot be mounted in Slot 1 of the basic/expansion chassis.

NOTE

About the Managed LIM

The Managed LIM is controlled by the WIM. It provides expanded functions for the management of Layer2 QoS (e.g. 802.1p (packet priority), 802.1q(VLAN), and IGMP snooping) as well as Layer 2 switching.

2.1 Rear Panel of the OfficeServ 7200

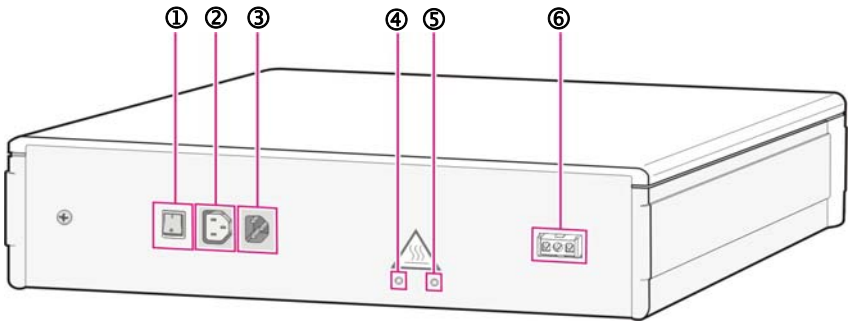

Figure 2.2 Rear Panel of the OfficeServ 7200

① Power switch
Switches system power on/off.

② Power connector between the basic chassis and expansion chassis
Connects the power supplied to the basic chassis with the expansion chassis.

③ Power I/O connector
Connects power cable.

④ AC LED
Lights when AC power is supplied.

⑤ DC LED
Lights when DC power is supplied.

⑥ Socket for backup battery cable
Connects the external batteries.

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3 Functional Modules

Both the basic chassis and expansion chassis have six slots in which modules can be mounted. The modules shown in the table below can be mounted in the slots depending on the configuration:

Table 2.2 Functional Modules

Function	Modules
Main Control Part	Basic chassis : MCP (optional module : RCM2, MFM, or MIS) Expansion chassis : LCP
Voice Trunk Line	TEPRI, 4BRI, 8TRK
Voice Station	16DLI, 8DLI, 16SLI, 8SLI, 16MWSLI, 8COMBO
Data	WIM (optional module : WIMD), Managed/Unmanaged LIM, 4DSL
Voice Application	4WLI, MGI (optional module : MGI2D)
Power, Fan	PSU, fan

3.1 Control Modules

This section describes the configuration and functions of the MCP, the main control module that controls all the functions of the OfficeServ 7200, and the LCP, the minor control module.

3.1.1 MCP

The MCP controls all the functions of the OfficeServ 7200 and is mounted in Slot 0 of the basic chassis. The MCP performs voice switching, processes signals and manages subscriber terminals.

Major Functions

The MCP performs the following functions:

- Operates applications through the LAN interface.
- Installation using the SmartMedia module.
- Backs up the database.
- Provides ports for the Universal Asynchronous Receiver and Transmitter (UART) test.
- Controls conferencing, detects caller IDs and multi-frequency, and controls door phones.
- Functions as the internal/external Music on Hold source or loud/common bell.
- Sets the time and shows table time.
- Functions as the Analogue Phase Locked Loop (APLL) for the synchronization of digital subscribers.

Specifications

The specifications of the MCP are shown in the table below:

Table 2.3 Specifications of the MCP

Category	Name	Specifications
CPU	Processor	MPC855T
	System clock	50 MHz
	Package	357P BGA
SDRAM	Capacity	64 MB
	Data bus width	32 bit
	Saves programs and data	
SRAM	Capacity	4 MB
	Data bus width	32 bit
	Saves data	
Flash ROM	Capacity	512 KB
	Data bus width	8 bit
	For booting	
Time Switch	Basic switch	256(Tx)x256(Rx)
	Data bus width	16 bit
Others	Internal MOH port	1
	External MOH port	2

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Front View

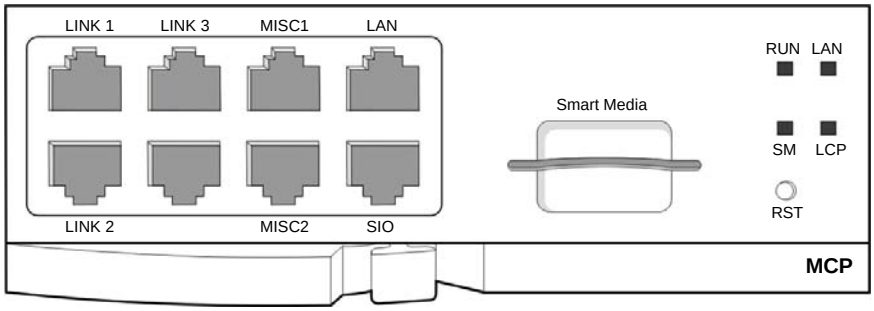

Figure 2.3 Front View of the MCP

The components on the front panel of the MCP have the following functions:

Table 2.4 Ports and LEDs of the MCP

Ports & LEDs	Function
LINK1~LINK3	Ports that connect the MCP with the LCP.
MISC1~MISC2	Ports that connect external music sources, paging device, loud bell, common bell, or door bell.
SmartMedia	Port for installing NAND-type flash memory.
LAN	Port for establishing the 10Base-T/100Base-Tx Ethernet connection.
SIO	UART port (for tests).
RST	Button for resetting the MCP module.
RUN LED	This LED indicates the status of the MCP. - Off : Power is not connected. - On : Booting. - Blink : The program is operating correctly.
LAN LED	This LED indicates the status of the connection to LAN. - Off : MCP is not connected to LAN. - On : MCP is connected LAN. - Blink : MCP is transmitting or receiving data through LAN port.
SM LED	This LED indicates the status of SmartMedia access. - Off : The SmartMedia is not installed. - On : The SmartMedia is installed but is not accessed. - Blink : The SmartMedia is installed and is being accessed.
LCP LED	This LED indicates the status of signalling message processing. - Off : There is no message exchange between MCP and LCP. - On : Messages are being sent/received to/from the LCP.

3.1.2 LCP

The LCP is the minor control module that controls a variety of line modules and sends/receives information to/from the MCP.

Front View

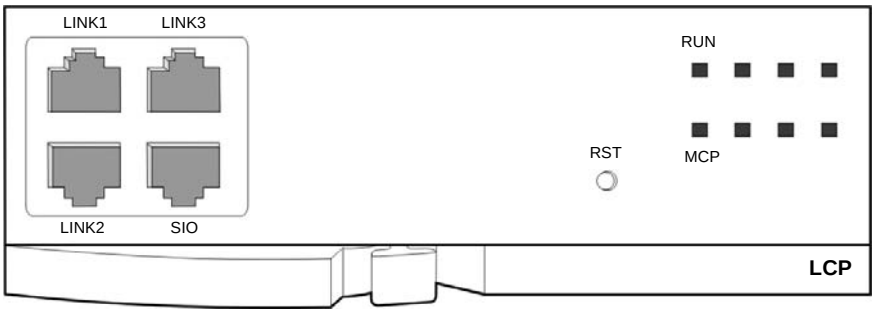

Figure 2.4 Front View of the LCP

The components on the front panel of the LCP have the following functions:

Table 2.5 Ports and LEDs of the LCP

Ports & LEDs	Function
LINK1~LINK3	Ports that connect the MCP with the LCP.
SIO	UART port (for tests).
RST	Button for resetting the LCP module.
RUN LED	This LED indicates the status of the LCP. - Off : Power is not connected. - On : Booting. - Blink : The RAM program is operating.
MCP LED	This LED indicates the status of signalling message processing. - Off : There is no message exchange between MCP and LCP. - On : Messages are being sent/received to/from the MCP.

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3.2 Voice Trunk Line Module

This section describes the modules that offer the voice service of trunk lines.

3.2.1 TEPRI

The TEPRI module provides the digital trunk line. A TEPRI module provides E1, T1, or ISDN PRI and functions as the Q-SIG. This module transmits voice via the trunk line and a channel transmits the voice data at 64 kbps.

Major Functions

The TEPRI voice trunk line module performs the following functions:

- Processes the T1/E1 signals by programming.
- Resistor Terminations for T1 line (100 Ω) and E1 line(120 Ω).
- Endures the ITU-recommended level of surge.
- Protects the output port by monitoring line signals.
- Crystal-less wander and jitter attenuation/compensation to TR62411.
- Attenuates/compensates jitter as recommended in ITU-T I.431 and G703.
- Provides the selectable line codec (HDB3, AMI).
- Performs local/remote loopback for test.
- Accommodates High level Data Link Control (HDLC) protocol in Common Channel Signalling(CCS) mode or Common Associated Signal (CAS) mode.

Specifications

The specifications of the TEPRI voice trunk line module are as follows:

- One trunk line port
- E1 : 30 channels
- T1 : 24 channels
- PRI : 30 channels

Front View

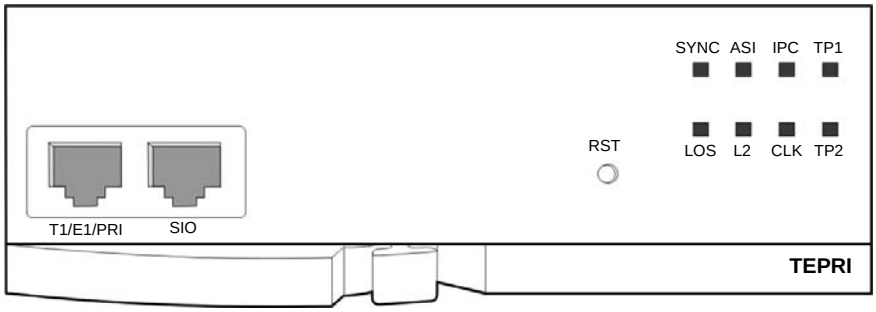

Figure 2.5 Front View of the TEPRI

The components on the front panel of the TEPRI module have the following functions:

Table 2.6 Ports and LEDs of the TEPRI

Ports & LEDs	Function
T1/E1/PRI	Ports that connect the T1/E1/PRI cable.
SIO	UART port (for tests).
RST	Button for resetting the TEPRI module.
SYNC LED	Clock synchronization. - On : the circuit is receiving the clocking signal and is synchronised - Off : the circuit is not receiving the clocking signal and is not synchronised..
LOS LED	This LED indicates whether signals have been lost. - On : Signals have been lost. - Off : Signals have not been lost.
AIS LED	This LED indicates whether the T1/E1 remote alarm has been generated. - On : The remote alarm has been generated. - Off : The remote alarm has not been generated.
L2 LED	This LED indicates the operational status of Layer 2 - On : The PRI Layer2 is operating correctly. - Off : The PRI Layer2 is operating abnormally.
IPC LED	This LED indicates that this module is working together with the higher-level module. - On : The module is working with the MCP/LCP. - Off : The module is not working with the MCP/LCP.

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Ports & LEDs	Function
CLK LED	This LED indicates whether this module is a master or slave. - On : The module is receiving the clock signal from the network and is the master clock source for the system. - Off : The module is not receiving the clock signal from the network OR it is not the master clock source for the system.
TP1 LED	This LED indicates whether the T1 is established. - This LED lights once the T1 is established.
TP2 LED	This LED indicates whether the PRI is connected. - This LED lights once the PRI is connected.

3.2.2 4BRI

The 4BRI module provides four ports for BRI-T/S connection. It transmits voice via the trunk line and a channel transmits voice data at 64 kbps

Major Functions

The 4BRI module performs the following functions:

- Processes T or S signals by programming.
- Processes the following signals by programming: Point to Point Normal, Point to Point DDI, Point to MultiPoint.
- Switchable Resistor Terminations (100Ω)
- Endures the ITU-recommended level of surge.
- Protects the output port by monitoring line signals.
- Crystal-less wander and jitter attenuation/compensation to TR62411.
- Attenuates/compensates jitter as recommended in ITU-T I.431 and G703.
- Performs local/remote loopback for test.

Specifications

The 4BRI module has eight line ports.

Front View

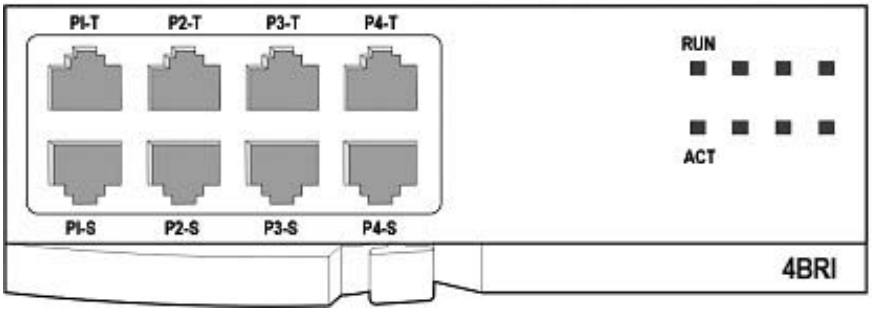

Figure 2.6 Front View of the 4BRI

The components on the front panel of the 4BRI module have the following functions:

Table 2.7 Ports and LEDs of the 4BRI

Ports & LEDs	Function
RUN	Circuit is connected to this port.
ACT	Circuit is in use on this port.

3.2.3 8TRK

The 8TRK module provides eight ports for analogue trunk lines. One module has the PRS, MPD, or CID path. It sends voice through the trunk lines and transmits voice data at 64 kbps to one channel.

Major Functions

The 8TRK voice trunk line module performs the following functions:

- Detects ring connection.
- Detects on/off-hook.
- Sends dial pulse.
- Performs detection of Polarity Reverse Signal (PRS).
- Performs the Caller ID (CID) function.
- Periodically checks if the line is connected. If so, the voice data can be transmitted. This function is called line monitoring.

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- Functions as the relay path of caller information. (When caller information is entered as 8TRK, connect the RCM – an optional module – with the MCP so that the caller information can be checked in the RCM module.).

Specifications

The 8TRK module has eight trunk line ports.

Front View

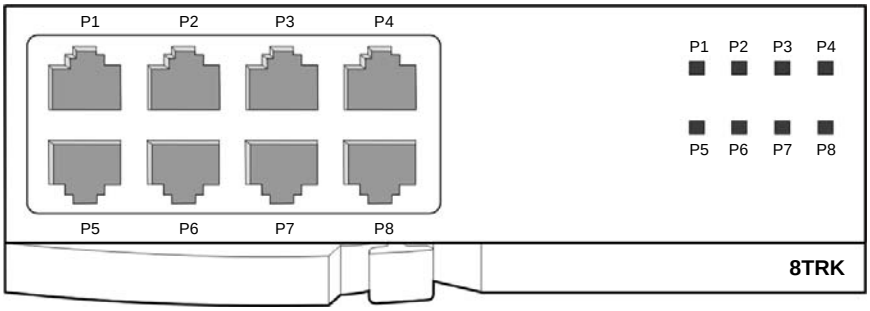

Figure 2.7 Front View of the 8TRK

The components on the front panel of the 8TRK have the following functions:

Table 2.8 Ports and LEDs of the 8TRK

Ports & LEDs	Function
P1~P8 (ports)	Trunk ports.
P1~P8 (LEDs)	These LEDs indicate the status of the ports. - Off : The trunk line is not being used. - On : The trunk line is being used. - Blink : The ring is being connected.

3.3 Voice Subscriber Line Module

This section describes the modules that offer voice paths for analogue and digital subscribers.

3.3.1 8SLI/16SLI/16MWSLI

The 8SLI module has eight ports, the 16SLI/16MWSLI modules 16 ports, for analogue stations. Each works with analogue phones via the trunk line to make voice communication.

Major Functions

The major functions of the 8SLI/16SLI/16MWSLI module are as follows:

- Generates a ring signal of 20/25 Hz.
- Detects DTMF/dial pulse.
- Detects on/off-hook.
- Generates various audible tones.
- Generates 100V pulse for message waiting handsets (16MWSLI only).

Specifications

The specifications of the 8SLI/16SLI/16MWSLI module are as follows:

- 8SLI module : 8 station ports
- 16SLI/16MWSLI module : 16 station ports

Front View of the 8SLI

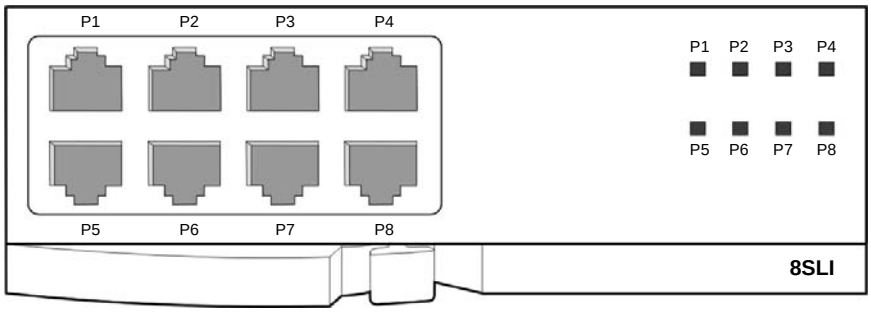

Figure 2.8 Front View of the 8SLI

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The components on the front panel of the 8SLI have the following functions:

Table 2.9 Ports and LEDs of the 8SLI

Ports & LEDs	Function
P1~P8 (ports)	Station ports for analogue phones.
P1~P8 (LEDs)	These LEDs indicate the operational status of the ports. - Off : The station is not being serviced. - On : The station is being serviced.

Front View of the 16SLI (and 16MWSLI)

The 16SLI and 16MWSLI have the same front panel. The “16SLI” only is shown (the 16MWSLI is marked “16MWSLI”).

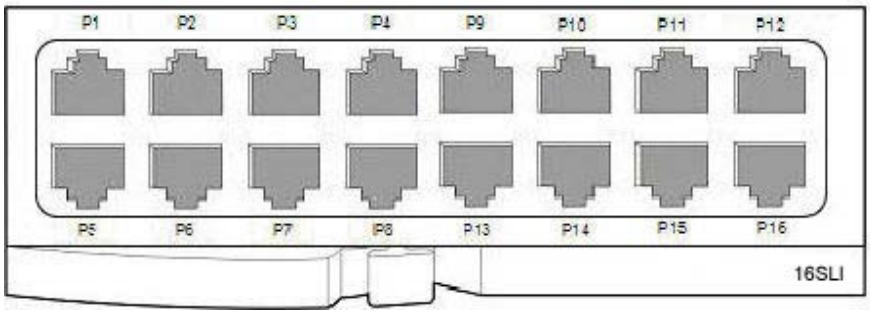

Figure 2.9 Front View of the 16SLI (and 16MWSLI)

The components on the front panel of the 16SLI have the functions below:

Table 2.10 Ports and LEDs of the 16SLI/16MWSLI

Ports & LEDs	Function
P1~P16 (ports)	Station ports for analogue phones.
P1~P16 (LEDs)	These LEDs indicate the status of the ports. - Off : The station is not being used. - On : The station is being used. If the LED turns green, P1-P8 is being used. If the LED turns red, P9-P16 is being used. If the LED turns yellow, both ports (e.g. P1 and P9) are being used simultaneously.

3.3.2 8DLI/16DLI

The 8DLI/16DLI module has 8 ports/16 ports for digital stations. It works with the Samsung digital phones to make voice communication.

Specifications

The specifications of the 8DLI/16DLI module are as follows:

- 8DLI module: 8 station ports and 2B+D (two voice channels and one signal channel) provided
- 16DLI module: 16 station ports and 1B+D (one voice channel and one signal channel) provided

Front View of the 8DLI

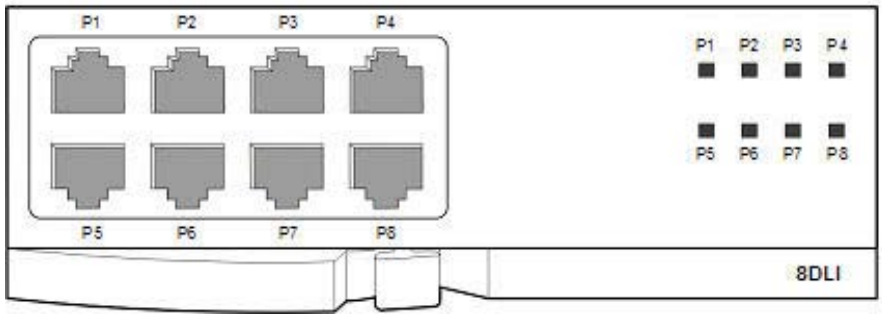

Figure 2.10 Front View of the 8DLI

The components on the front panel of the 8DLI have the following functions:

Table 2.11 Ports and LEDs of the 8DLI

Ports & LEDs	Function
P1~P8 (ports)	Station ports for Samsung digital phones.
P1~P8 (LEDs)	These LEDs indicate the status of the ports. - Off : The station is not being used. - On : The station is being used.

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Front View of the 16DLI

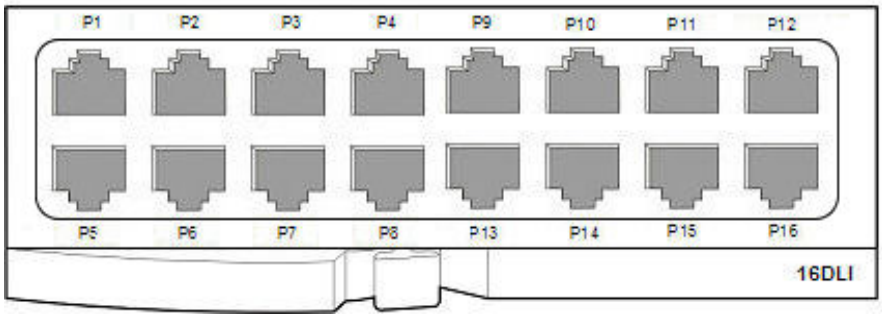

Figure 2.11 Front View of the 16DLI

The components on the front panel of the 16DLI have the functions below:

Table 2.12 Ports and LEDs of the 16DLI

Ports	Function
P1~P16	Station ports of Samsung digital phones.

3.3.3 8COMBO

The 8COMBO module has eight ports for analogue stations and eight ports for digital stations. It works with analogue phones or digital phones to make voice communication.

Major Functions

The major functions of the 8COMBO module are as follows:

- Generates ring of 20/25 Hz.
- Detects the DTMF/dial pulse.
- Detects on/off-hook.
- Generates a tone.

Specifications

The specifications of the 8COMBO module are as follows:

- 8 analogue station ports
- 8 digital station ports

Front View

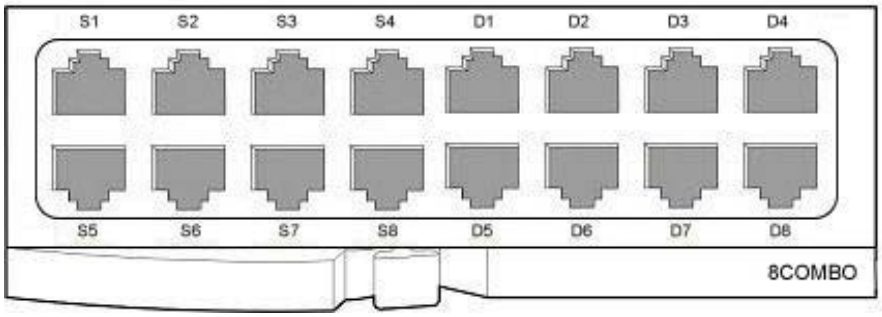

Figure 2.12 Front View of the 8COMBO

The components on the front panel of the 8COMBO have the following functions:

Table 2.13 Ports of the 8COMBO

Ports	Function
S1~S8	Analogue station ports.
D1~D8	Digital station ports.

3.4 Data Modules

This section describes the data modules for transmitting/receiving data to/from the Internet or Intranet.

3.4.1 WIM

The WIM module allows the OfficeServ 7200 to transmit/receive data to/from the external Internet. It offers a variety of external interfaces and ports for connecting with the internal network. One WIM module provides applications and a variety of external interfaces.

Major Functions

The major functions of the WIM data module are as follows:

- Works with dedicated lines using V.35.
- Provides the 10Base-T/100Base-Tx Ethernet port that works with the xDSL or cable modem.
- Provides the 10Base-T Ethernet port for backup.
- Offers the De-Militarized Zone (DMZ) service.
- Provides the 10Base-T/100Base-Tx Ethernet port for the LAN interface.
- Provides the UART port for configuration setting.
- Provides applications such as a firewall and VPN.

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Specifications

The specifications of the WIM data module are as follows:

- One V.35 serial port
- Two ports for connecting with the external Ethernet network
- One 10Base-T/100Base-Tx Ethernet port for the DMZ
- One 10Base-T/100Base-Tx Ethernet port for the station LAN

Front View

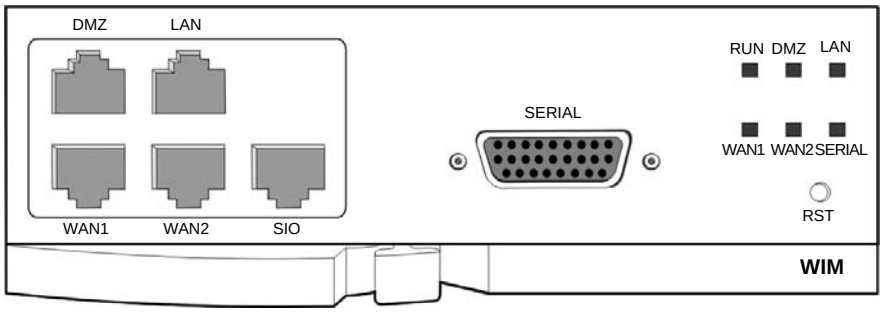

Figure 2.13 Front View of the WIM

The components on the front panel of the WIM have the following functions:

Table 2.14 Ports and LEDs of the WIM

Ports & LEDs	Function
DMZ port	Internal port (does not need firewalls)
LAN port	Ethernet port connected with the Intranet
SERIAL connector	Port connecting the dedicated serial line that works with the V.35
WAN1, WAN2 port	WAN interface port that works with 10Base-T/100Base-Tx Ethernet
SIO port	UART port (for tests)
RST	Button for resetting the WIM module
RUN LED	This LED indicates the operational status of the WIM. - Off : The WIM module is in an abnormal status or power is not being supplied. - On : The WIM module is operating correctly.
DMZ LED	This LED indicates the operational status of the DMZ. - Off : The link is not connected. - On : The link is operating.
SERIAL LED	This LED indicates the operational status of the LAN. - Off : The link is not connected. - On : The link is operating.
WAN1, WAN2 LED	This LED indicates the operation status of the WAN. - Off : The link is not connected. - On : The link is operating.

3.4.2 LIM

The LIM module sends/receives data in the Intranet, and provides a 10Base-T/100Base-Tx interface. It functions as a hub for switching. The LIM module works with the WIM through the internal back panel to provide the VLAN function for supporting QoS.

Major Functions

The major functions of the LIM data module are as follows:

- Detects 10Base-T/100Base-Tx, or full/half duplex automatically.
- Detects Tx/Rx automatically. (Not supported.)
- Offers the VLAN for supporting QoS.
- Functions as a switching hub.

Specifications

The LIM data module provides 16 x 10Base-T/100Base-Tx ports.

Front View

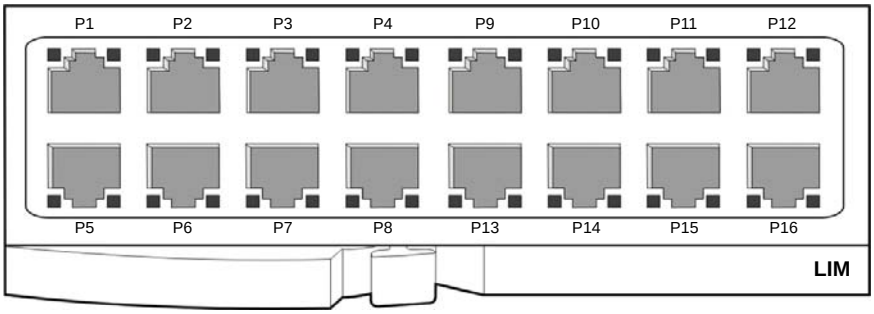

Figure 2.14 Front View of the LIM

The components on the front panel of the LIM have the following functions:

Table 2.15 Ports and LEDs of the LIM

Ports & LEDs	Function
P1~P16	Ports for connecting Ethernet.
Left LED of each port	The LED blinks if the link is operating.
Right LED of each port	The LED indicates if the port is operating. - Off : The 10Base-T port is operating. - On : The 100Base-Tx port is operating.

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3.4.3 4DSL

The 4DSL module uses VDSL technology to send/receive data to/from the external IP devices in the Intranet. The 4DSL provides the VLAN function to support QoS.

Specifications

- 4 xDSL ports
- Transmission distance : 1 km
- Up/down link : more than 20 Mbps

Front View

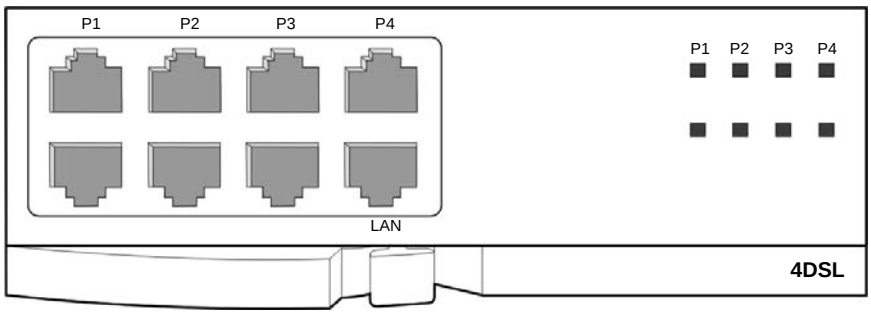

Figure 2.15 Front View of the 4DSL

The components on the front panel of the 4DSL have the following functions:

Table 2.16 Ports and LEDs of the 4DSL

Ports & LEDs	Function
P1~P4	Ports connecting the VDSL.
LAN	10Base-T/100Base-Tx Ethernet port for connecting with the higher-level Intranet.
P1~P4 LED	These LEDs indicate the status of the ports. - Off : The link is not connected. - On : The link is operating. - Blink : Data is being transmitted/sent.

3.5 Voice Application Modules

This section describes:

- the MGI module that converts voice to data and then sends/ receives the data
- the 4WLI module that uses the Digital Adaptor for Subscriber Loop (DASL) to send/receive voice to/from the phone system and wireless base station
- the SVMi-20E integrated voice mail module.

3.5.1 MGI

The MGI module converts voice to data and then sends/receives the data via the data network. The MGI offers up to 16 channels and uses G.729, G.723, G.726, and G.711 for voice decompression. It provides the VoIP functions to serve as both a client and server.

Major Functions

The major functions of the MGI module are as follows:

- Voice decompression: G.729, G.723, G.726, and G.711
- Facsimile relay: One of four channels is used.
- Echo cancellation
- Volume adjustment (-30 ~ +30 dBm)
- Silence suppression

Front View

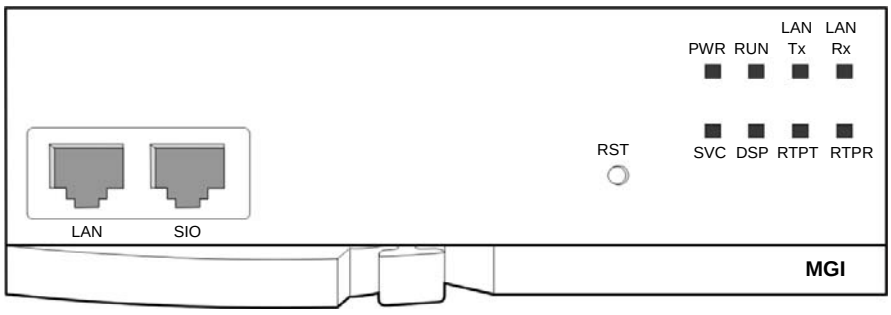

Figure 2.16 Front View of the MGI

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The components on the front panel of the MGI have the following functions:

Table 2.17 Ports and LEDs of the MGI

Ports & LEDs	Function
LAN port	Port connecting Ethernet.
SIO port	UART port (for tests).
RST	Button for resetting the MGI.
PWR LED	This LED indicates the power supply status. - Off : Power is not being supplied. - On : Power is being supplied normally.
RUN LED	This LED indicates MCP status. - Off : Power is not being supplied. - On : Booting. - Blink : The RAM program is operating.
LAN Tx LED	This LED indicates the status of Ethernet data transmission. - Off : Data does not exist. - On or blink : Data is being transmitted.
LAN Rx LED	This LED indicates the reception status of the link and Ethernet data. - Off : Data does not exist or the link is not connected. - On or blink : Data is being received.
SVC LED	This LED indicates if the service is being offered. - LED blinks when the software task can be serviced.
DSP LED	This LED indicates if the VoIP DSP is operating. - LED blinks when the VoIP DSP operates.
RTPT LED	This LED indicates if the voice packets are being forwarded. - LED turns on when the voice packets are forwarded.
RTPR LED	This LED indicates if the voice packets are being received. - LED turns on when the voice packets are received.

3.5.2 4WLI

The 4WLI interface module uses the DASL to send/receive voice to/from the phone system and wireless base station. This module decompresses the voice of the G.711 and uses the wireless method of 802.11b WLAN or DECT. The 4WLI accommodates four base stations and one base station can accommodate four channels. One WLI platform interfaces the DECT with the WLAN by software conversion to work with the wireless base station.

Major Functions

The major functions of the 4WLI voice application module are as follows:

- Voice decompression: G.711
- Wireless specification: 802.11b WLAN

Specifications

The specifications of the 4WLI module are as follows:

- Up to four base stations.
- Simultaneous calling through up to four channels per base station.
- Maximum of 48 mobile station subscribers supported.

Front View

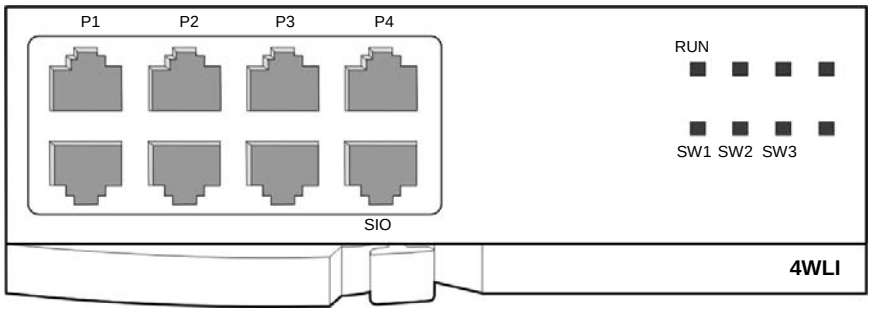

Figure 2.17 Front View of the 4WLI

The components on the front panel of the 4WLI have the following functions:

Table 2.18 Ports and LEDs of the 4WLI

Ports & LEDs	Function
P1~P4	Port for connecting the WBS24 base station.
SIO	UART port (for tests).
RUN LED	This LED turns on when the wireless LAN operates.
SW1~SW3 LED	This LED turns on when the software task operates.

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3.5.3 SVMi-20E

The SVMi-20E integrated voice mail module provides personal voice mailboxes, fax server functionality, Auto Attendant, in-queue messages for callers in UCD group queues, informal call recording, MOH functionality and Answering Machine Emulation.

Major Functions

The major functions of the SVMi-20E module are as follows:

- Voice mailbox
- Voice mail to e-mail gateway
- Fax mail server
- Auto Attendant
- MOH ports
- Answering Machine Emulation
- Expandable using daughterboard modules

Front View

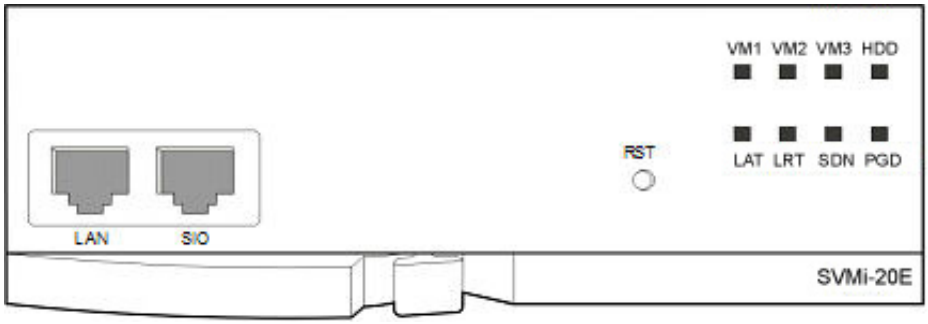

Figure 2.18 Front View of the SVMi-20E

Table 2.19 Ports and LEDs of the SVMi-20E

Ports & LEDs	Function
LAN	Port connecting Ethernet.
SIO	UART port (for tests).
RST	Button for resetting the module.
VM1 LED	Indicates addition of voice module 1
VM2 LED	Indicates addition of voice module 2
VM3 LED	Indicates addition of voice module 3
HDD LED	Indicates hard disk activity
LAT LED	LAT LED

Ports & LEDs	Function
LRT	LRT LED
SDN	SDN LED
PGD	PGD LED

3.6 Power Supply Unit

The Power Supply Unit (PSU) is installed in the chassis of the OfficeServ 7200. It supplies -48 V DC power from the external power supply to each module. The power I/O specifications are shown in the table below:

Table 2.20 I/O Voltage of the PSU

Item	Specification
Input Voltage	110/240 V
Output Voltage	-48 V/2.2 A -54 V/0.4 A Backup +5 V/8 A +3.3 V/10 A +12 V/0.4 A -5.3 V/1 A
Max power consumption	252 W

About the configuration of the PSU

For information about the configuration of the PSU and the functions of each component, refer to **2 Chassis Configuration** in this chapter.

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4 Station Phones

This section describes the types and features of analogue/digital station phones that can be connected to the OfficeServ 7200 system.

4.1 Analogue Phones

Analogue phones used for voice calls are connected to the 8SLI/ 16SLI/ 16MWSLI/8COMBO module ports mounted in a universal slot of the system.

4.2 Digital Phones

Digital phones are used for voice calls or data transmission and are connected to the 8DLI/16DLI/8COMBO module ports mounted in a universal slot of the system. Digital phones can be connected to devices such as AOMs and some support the use of keyset daughterboards (KDB-D, KDB-S or KDB-F).

5000 Series Digital Keysets

14-Button 2-Line LCD Keyset (DS-5014D)

- 48-character display (2x24) LCD with three associated soft keys and scroll key
- 14 programmable keys
- Navigation keys for easy use of keyset functions
- Five fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

21-Button 2-Line LCD Keyset (DS-5021D)

- 48-character display (2x24) LCD with three associated soft keys and scroll key
- 21 programmable keys
- Navigation keys for easy use of keyset functions
- Five fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

7-Button 2-Line LCD Keyset (DS-5007S)

- 48-character display (2x24) LCD with three associated soft keys and scroll key
- 7 programmable keys
- Five fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

14-Button 2-Line LCD Keyset (DS-5014S)

- 48-character display (2x24) LCD with three associated soft keys and scroll key
- 14 programmable keys
- Five fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

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38-Button 2-Line LCD Keyset (DS-5038S)

- 48-character display (2x24) LCD with three associated soft keys and scroll key
- 38 programmable keys
- Five fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

12-Button Large LCD Keyset (DS-5012L)

- Large LCD with 12 keys for feature selection
- Supports data transfer, handset calls and full-duplex speakerphone
- USB interface
- Navigation keys for easy use of keyset functions
- Five fixed-function keys
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes

Up to eight DS-5012L phones can be connected with the DLI module (8DLI/16DLI). 24 DS-5012L phones can be connected to both the basic chassis and expansion chassis (48 total).

4.3 IP Phones

Internet (IP) phones use IP addresses to send/receive voice and data. They use existing data network lines, so do not need normal phone lines, and can be connected to devices such as a switching hub. They are connected to other digital phones through the MGI module.

5000 Series IP Keysets

12-Button Large LCD IP Keyset (ITP-5012L)

- Large LCD with 12 keys for feature selection
- Supports data and voice transfer using Internet Protocol
- Navigation keys for easy use of keyset functions
- Five fixed-function keys
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes

14-Button 2-Line LCD IP Keyset (ITP-5014D)

- 48-character display (2x24) LCD with three associated soft keys and scroll key
- Supports data and voice transfer using Internet Protocol
- 14 programmable keys
- Navigation keys for easy use of keyset functions
- Five fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

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21-Button 2-Line LCD IP Keyset (ITP-5021D)

- 48-character display (2x24) LCD with three associated soft keys and scroll key
- Supports data and voice transfer using Internet Protocol
- 21 programmable keys
- Navigation keys for easy use of keyset functions
- Five fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- Eight selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

4.4 Add-On Module (AOM)

DS-5064B 64-Button AOM

- 64 programmable keys with red LEDs
- Up to four can be assigned to a keyset to provide additional programmable keys

4.5 Keyset Daughterboards

5000 Series Keyset Daughterboards

DS-5014D, DS-5021D and DS-5038S keysets support one of three different types of daughterboard installed on them to enhance operation or to provide an additional local port, depending on the type of daughterboard.

KDB-Digital Line Interface (KDB-D)

If your keyset is connected to a Digital Line Interface (DLI) port that supports 2B+D operation, you may install a daughterboard that provides a Digital Line Interface (DLI) port for connection of a digital station device such as a keyset or 64 button add-on module.

KDB-Single Line Interface (KDB-S)

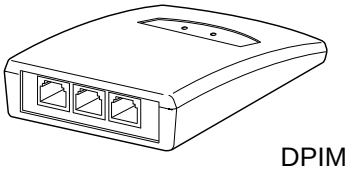
If your keyset is connected to a Digital Line Interface (DLI) port that supports 2B+D operation, you may install a daughterboard that provides a Single Line Interface (SLI) port for connection of a standard telephone device such as a cordless phone.

KDB-Full Duplex (KDB-F)

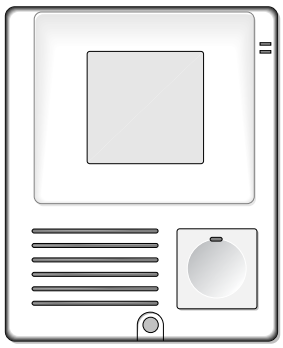
The standard speakerphone mode of operation for 2-line LCD keysets is “half duplex”. This means that you cannot transmit and receive speech at the same time. Adding an KDB-F to your keyset will convert the speakerphone into full duplex mode, enhancing its operation. In addition, the KDB-F may have up to three external microphones attached to it for conference room type applications. These microphones require an “EXTMIC” key programmed on the keyset to activate or deactivate them.

4.6 Door Phone and Door Phone Interface Module (DPIM)

The DPIM adapts any DLI circuit for use with the door phone unit. The unit is commonly used to request entry through locked doors (interior or exterior) or as a room monitoring box. It provides contact control to be used with a customer-provided electric door lock. The door phone is wall-mounted. An external weather-resistant unit is also available.



DPIM



Door Phone

5 Wireless LAN Equipment

This section describes the wireless LAN base station and mobile stations that can be connected with the OfficeServ 7200 system.

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5.1 Wireless LAN Base Station (WBS24)

The WBS24 consists of both wired and wireless processing parts. WBS24s are normally referred to as Access Points (APs).

The wired processing part has an ISDN BRI interface connected with the OfficeServ 7200 and an IEEE 802.3 Ethernet interface connected with the LAN. The wireless processing part has an IEEE 802.11b standard and wireless LAN RF interface with a wireless frequency band of 2.4 GHz.

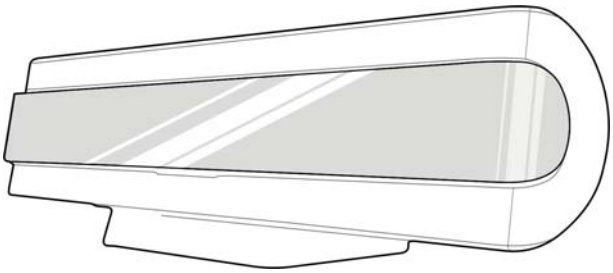

Figure 2.19 WBS24

The wired Ethernet interface is connected with the LAN (based on 10Base-T/100Base-Tx) and transmits/receives data, e.g., Internet access, other than voice.

The wireless processing part transmits/receives voice data for wireless voice calls and also accesses the wireless Internet. The maximum transmitting speed on the wireless section is 5~6 Mbps. About 20 people can simultaneously access the wireless Internet using a WBS24.

5.2 Mobile Station (WIP-5000M)

The WIP-5000M (Wireless IP-Phone Mobile type) uses the wireless LAN (IEEE802.11b) to allow users to make calls. The WIP-5000M supports hand-over when moving between APs. Data terminals such as laptops can also be used where the wireless LAN is enabled. The WIP-5000M also performs the message service functions supported by the OfficeServ 7200 system.

Figure 2.20 WIP-5000M

6 Additional Devices

This section describes the types and features of devices that can be optionally connected when the OfficeServ 7200 is installed.

6.1 On Hold/Background Sound Source

Cassettes, radios and CD players may be connected to provide sound sources in addition to the basic tone provided by the system or internal sound source. These allow background and “on hold” music to play to callers and phone users.

Output Resistance

The output resistance of FM radios, CD players or cassette recorders should be 8 Ω to 16 Ω.

6.2 External Units

The OfficeServ 7200 may be connected with external units such as amplifiers or speakers. External units are connected via the MISC1 port of the MCP module to the MIS option module installed in the MCP.

6.3 Loud Bell

The loud bell uses amplifiers or external speakers to allow users to hear external ringing calls. It is connected via the MISC1 port of the MCP module to the MIS option module installed in the MCP. A user’s phone may be allocated instead in MMC 205 (Assign Pair Station) to ring for the loud bell.

6.4 Common Bell

The common bell is a ring that can be specified when a station group is set. When a station in a group rings, other stations in the same group ring. The common bell is connected via the MISC2 port of the MCP module to the MIS option module installed in the MCP.

6.5 OfficeServ Manager

The PC Man Machine Communication application (called the OfficeServ Manager) is software for maintaining the OfficeServ 7200. The functions for controlling the system database are implemented in the form of menus; thus, the OfficeServ Manager is convenient and easy to use when system data is displayed or changed.

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6.6 SMDR

The Station Message Detail Recording (SMDR) manages call data such as calls between station users and local/long distance/international calls. Connect the SMDR printer or SMDR PC with the OfficeServ 7200 to use the SMDR data provided by the system. The precise details provided by SMDR can be programmed in the system.

The SMDR printer can display the calling history received from the system. The SMDR PC displays calling history received from the system and can calculate call costs using the SMDR software. The SMDR PC therefore allows more efficient use of data than the SMDR printer alone.

6.7 CTI

Computer Telephony Integration (CTI) is an integrated system for computers and telephony: users can operate their phones directly from the screens of their PCs using special applications running on their local area network. CTI provides convenience, reduced costs, enhanced services and reduced call-processing time.

In particularly, the CTI call centre system configures customer databases so that agents can consult with customers by phone on a one-to-one basis with the customer’s details shown on the PC screen.

The OfficeServ 7200 supports the standard Telephony Application Programming Interface (TAPI), which is implemented in a client/server environment and controls third-party calls.

CHAPTER 3

OfficeServ 7200 Specifications

This chapter describes the OfficeServ 7200 system capacity, signal specifications, power specifications, rings and tones, compatible modules and terminals, and equipment specifications.

1 System Capacity

Up to 160 lines can be installed and operated in the system, and the ratio of station and trunk lines can be adjusted within the capacity limit, depending on users' needs. Table 3.1 shows the maximum line capacity of the OfficeServ 7200.

Table 3.1 Capacity of the OfficeServ 7200

System Configuration	Maximum Line Capacity
Basic chassis	When using the E1 : 90 When using the 8TRK : 40 When using the station : 80 When using the maximum capacity : 122 (voice) When using the LAN switch : 64 When using the VDSL : 20 When using the WLAN terminal : 48
Basic chassis + expansion chassis	When using the E1 : 120 When using the 8TRK : 80 When using the station : 96 When using the maximum capacity : 216 (voice) When using the LAN switch : 128 When using the VDSL : 40 When using the WLAN terminal : 48

1.1 Trunk Line Capacity

The maximum trunk line capacity of the OfficeServ 7200 is based on its configuration and is shown in Table 3.2.

Table 3.2 Trunk Line Capacity

System Configuration	Analogue	Digital			
	LOOP TRK	BRI	T1 TRK	E1 TRK	PRI TRK
Basic chassis	40	40	72	90	T1 : 72 E1 : 90
Basic chassis + expansion chassis	80	80	96	120	T1 : 96 E1 : 120

1.2 Station (Subscriber) Line Capacity

The maximum station line capacity for analogue phones and digital phones in the OfficeServ 7200 is based on its configuration and is shown in Table 3.3.

Table 3.3 Station Line Capacity

System Configuration	Analogue phones	Digital Phones
Basic chassis	80	80 (DS-5012L : 24)
Basic chassis + expansion chassis	160	160 (DS-5012L : 48)

2 Electrical Specifications

2.1 Signal Specifications

The signal processing protocol is used for interfacing messages between the trunk lines/stations and the system. Also, the signal processing protocol refers to the method for providing status information.

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2.1.1 Signalling Type of the Trunk Line

Loop Start

When processing the loop start signals, the on-hook and off-hook status is controlled by the flow of the electric current. The loop is a closed loop trunk circuit or standard 2500-type set loop.

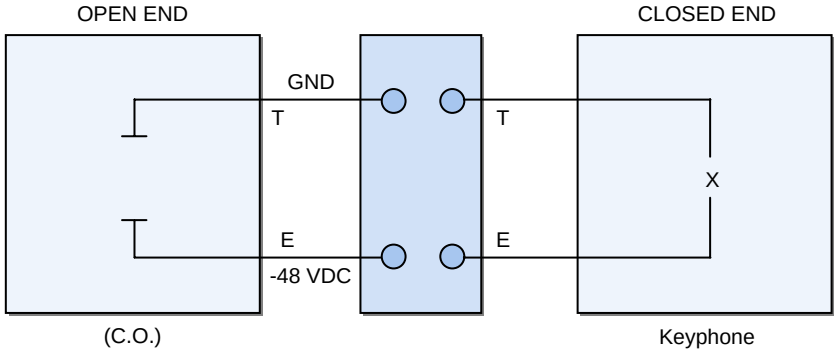

Figure 3.1 Trunk Line Loop Start Signalling

T1 Trunk Line

The electrical characteristics of the T1 trunk line should comply with the ITU G.703 and G.704 standards.

Table 3.4 Electrical Characteristics of the T1 Trunk Line

Category		Specification
Transfer speed		1544 kbit/s ±50 ppm
Code		AMI or B8ZS
Pulse type		Regular square wave : When indicating all valid signals, comply with the mask (G.703) regardless of the codes.
Transmission media		Pair of twisted lines
Load resistance		120 Ω
Indicated (pulse) nominal peak voltage		3.00 V
Signal Level	Power at the frequency of 772 kHz	±12 ~ ±19 dBm
	Power at the frequency of 1544 kHz	25 dB or higher when the power is less than the power at the frequency of 772 kHz

The signalling specifications and signalling method of the T1 trunk line should comply with the ITU G.703 and G.704 standards.

E1 Trunk Line

The electrical characteristics of the E1 trunk line comply with the ITU G.703 and the G.704 standards.

Table 3.5 Electrical Characteristics of the E1 Trunk Line

Category	Specification
Transmission speed	2048 kbit/s ±50 ppm
Code	High Density Bipolar of Order 3 (HDB3)
Pulse type	Regular square wave : When indicating all valid signals, comply with the mask (G.703) regardless of the codes.
Nominal and pulse	244 ns
Jitter of the I/O terminal	Refer to the G.823.
Transmission media	Pair of twisted lines
Load resistance	120 Ω
Indicated (pulse) nominal peak voltage	3.00 V
Blank(non-pulse) peak voltage	0 ± 0.300 V

The signalling specification and signalling method of the E1 trunk line should comply with the ITU G.703 and G.704 standards.

Characteristics of the ISDN Interface Transmission

The electrical characteristics of the ISDN (BRI) interface comply with the ITU I.430 and ETS 300 012 standards.

Table 3.6 Electrical Characteristics of the BRI Trunk Line

Category	Specification
Transmission speed	192 kbit/s ±100 ppm
Code	AMI
Pulse type	Regular square wave : When indicating all valid signals, comply with the mask (I.403) regardless of the codes.
Transmission media	Pair of twisted lines
Load resistance	120 Ω
Indicated(pulse) nominal peak voltage	2.75 V

The electrical characteristics of the ISDN (PRI) interface should comply with the ITU I.431 and ETS 300 011 standards.

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Table 3.7 Electrical Characteristics of the PRI Trunk Line

Category	Specification
Transmission speed	2048 kbits/s ±50 ppm
Code	High Density Bipolar of Order 3 (HDB3)
Pulse type	Regular square wave : When indicating all valid signals, comply with the mask (I.403) regardless of the codes.
Nominal and pulse	244 ns
Transmission media	Pair of twisted lines
Load resistance	120 Ω
Indicated (pulse) nominal peak voltage	3.00 V
Blank (non-pulse) peak voltage	0 ±0.300 V

The electrical characteristics of the Digital Line Interface (DLI) are shown in Table 3.8.

Table 3.8 Electrical Characteristics of the DLI Line

Category	Specification
Transmission speed	144 kbits/s
Code	AMI
Pulse type	Typical AMI waveform

2.1.2 Signalling Type of the Dedicated Line

Electrical Characteristics of the WIM Interface

The electrical characteristics of the V.35 interface are shown in Table 3.9.

Table 3.9 Electrical Characteristics of the WIM Interface (V.35 Interface)

Category	Specification
Maximum transmission speed	10 Mbits/s
Transmission code	V.35 driver
Number of transmission lines	18
Characteristic resistance	100 Ω
Indicated (pulse) nominal peak voltage	±2 V
Input differential threshold	±80 MV

The electrical characteristics of the RS-232C (V.28) interface are shown in Table 3.10.

Table 3.10 Electrical Characteristics of the WIM Interface (RS-232C Interface)

Category	Specification
Maximum transmission speed	230 kbits/s
Transmission code	V.28 driver
Number of transmission lines	14
Characteristic resistance	3 KΩ - 7K Ω
Indicated (pulse) nominal peak voltage	±15 V
Input threshold	+1.2 - 1.7 V

The electrical characteristics of the RS-449 (V.11) interface are shown in Table 3.11.

Table 3.11 Electrical Characteristics of the WIM Interface (RS-499 Interface)

Category	Specification
Maximum transmission speed	10 Mbits/s
Transmission code	V.11 driver
Number of transmission lines	24
Characteristic resistance	100 Ω
Indicated (pulse) nominal peak voltage	±10 V
Input threshold	±0.3 V

2.1.3 Signalling Type of the LAN

The electrical characteristics of the LAN 10Base-T interface, which complies with the IEEE802.3 standard, are shown in Table 3.12.

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Table 3.12 Electrical Characteristics of the LAN Interface (10Base-T)

Category	Specification
Transmission speed	10 Mbits/s ±50 ppm
Transmission code	Manchester coding - When the transmission data bit is '0', the higher level of the middle bit is inversed into the lower level. When the transmission data bit is '1', the lower level of the middle bit is inversed into the higher level.
Access control method	CSMA/CD
Transmission media	UTP CAT3, CAT4, CAT5, STP
Number of UTP pairs	2 pairs
Characteristic resistance	100 Ω
Cable thickness	Diameter : 0.51 mm (#24 AWG), External diameter : 5 mm

The electrical characteristics of the LAN 100Base-Tx interface, which complies with the IEEE802.3u standard, are shown in Table 3.13.

Table 3.13 Electrical Characteristics of the LAN Interface (100Base-Tx)

Category	Specification
Transmission speed	100 Mbits/s ±50 ppm
Transmission code	4B/5B+MLT-3(4bit/5bit) converts 4-bit data to 5-bit data and encodes the data on the physical layer. Multi Level Transmission-3(MLT-3) encodes transmission data into 3 levels (high, middle and low)
Access control type	CSMA/CD
Transmission media	UTP CAT5, STP
Number of UTP pairs	Two pairs
Characteristic resistance	100 Ω
Cable thickness	Diameter : 0.51 mm (#24 AWG), External diameter : 6 mm

2.1.4 Signalling Type of the Station

Dial Pulse Signalling Type

- Ratio = 10 Pulses Per Second (PPS)
- Make/Break Ratio (M/B ratio) = 33 %: 66 % (can be adjusted in the software).
- The minimum signalling time between digits = 20 msec (can be adjusted in the software).

DTMF Push Button Dialling

DTMF signal processing complies with the ITU standard and enables the user to send/receive digital phone signals through the trunk line and to process analogue phone signals.

2.1.5 Signalling Type of the VDSL

The electrical characteristics of the VDSL for using long-distance Ethernet are shown in Table 3.14.

Table 3.14 Electrical Characteristics of the VDSL Interface

Category	Specification
Transmission speed	More then 20 Mbps
Modulation code	Quadrature Amplitude Modulation (QAM)
Error detection	Reed Solomon coding method
Transmission distance	1 km
Transmission media	One pair of twisted lines
Characteristic resistance	Splitter installed
Used frequency	138 kHz~12 MHz
Link speed	Down link : 20 Mbps (300 m), Up link : 8 Mbps (300 m)

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2.2 Transmission Characteristics

- Attenuation
  - Attenuation between subscribers : Less than 6 dB
  - Attenuation between subscriber and local trunk line : Less than 0.5 dB
- Characteristic resistance of the line : 600 Ω
- Weighted noise : Less than -65 dBm
- Crosstalk attenuation : Less than -68 dBm
- Frequency band : 300~3400 Hz
- Insulation resistance : More than 1 MΩ

2.3 Line Conditions

- Length for installation:
  - Analogue phones : Up to 1 km (when #24 AWG (0.51mm) cable is used)
  - Digital phones : Up to 400 m (when #24 AWG (0.51mm) cable is used)
  - Door phones : Up to 400 m (when #24 AWG (0.51mm) cable is used)
  - AOMs : Up to 400 m (when #24 AWG (0.51mm) cable is used)
- Leakage resistance between lines : More than 20 kΩ
- Leakage resistance between grounds : More than 20 kΩ

3 Power Specifications

3.1 Power Supply Module

This module operates using the system AC input power or battery power and supplies the system chassis with backup power of -48 V, -5 V, +5 V, +3.3 V, +12 V, or -56 V.

Table 3.15 Specification of the Power Supply Module

Category	Power Specifications
Input condition	AC 110 V/220 V
Output condition	48 V DC, 2.2 A +5 V DC, 8.0 A -5 V DC, 1.0 A +3.3 V DC, 10 A +12 V DC, 0.4 A -56 V Back-up 0.4 A
Max power consumption	252 W

4 Rings and Tones

4.1 Ring Cycles

The OfficeServ 7200 provides trunk line, station, door and alarm rings. The on/off cycle for each ring type is shown in Table 3.16.

Table 3.16 System Ring Cycles

Ring	On/Off Cycle
Trunk line ring	400/200/400/3000 ms
Station ring	1000/2000 ms
Door ring	400/200/400/200/400/2000 ms
Alarm ring	400/200/400/200/400/200/400/1000 ms

Ring On/Off Cycle

The on/off cycle can be adjusted by changing the values in the system software.

4.2 Tones

For system ring signals, the output voltage is 75 V and the frequency is 20 Hz.

The OfficeServ 7200 provides users with various tones to notify them of the status of functions and provide feedback. The on/off cycles of currently specified tones are shown in Table 3.17.

Table 3.17 System Tone Cycles

Tone	On/Off Cycle
Dial tone	1000/250 ms
Busy Tone	500/500 ms
Do Not Disturb tone	250/250 ms
Ring Back tone	1000/2000 ms
Call Park tone	Continuous
Confirmation/Caution/Barge-In tone	50/50 ms
Call Back/Hold tone	500/3500 ms
Ring Back tone	1000/2000 ms
Error/Number Unobtainable tone	250/250 ms
Message Camp On tone	Continuous

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Tone On/Off Cycle

The On/Off cycle can be adjusted by changing the values in the system software.

5 Available Terminals

The terminals available to the OfficeServ 7200 are shown in Table 3.18.

Table 3.18 OfficeServ 7200 Compatible Terminals

Type	Terminal
DS-5000 series digital phone	DS-5007S, DS-5014S, DS-5014D, DS-5021D, DS-5038S, DS-5012L
ITP-5000 series IP phone	ITP-5014D, ITP-5021D, ITP-5012L
Wireless LAN device (WLAN)	WIP-5000M (MS), WBS24 (Access Point device)
AOM	DS-5064B
Others	KDB-S, KDB-D, KDB-F, DPIM, door phone

Compatible Terminals

All terminals compatible with the Samsung OfficeServ range of systems are available to the OfficeServ 7200.

6 Equipment Specifications

The OfficeServ 7200 consists of two chassis shown in Figure 3.2.

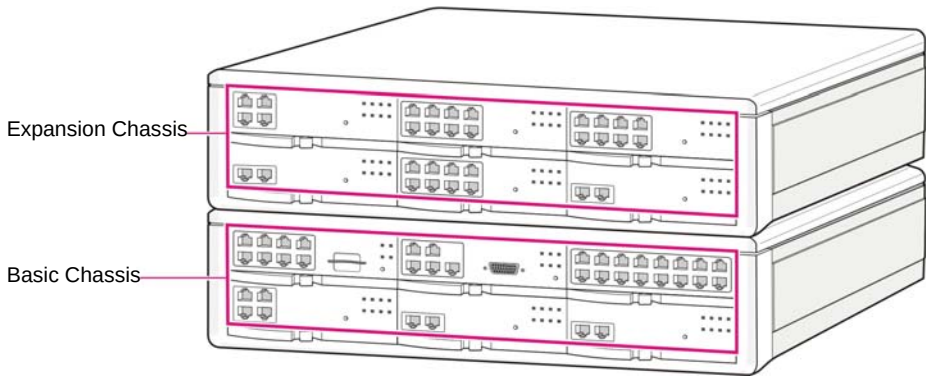

Figure 3.2 OfficeServ 7200 Chassis Configuration

- Basic chassis only: 440(W)×123.8(H)×410(D) mm
- Basic chassis plus expansion chassis: 440(W)×247.6(H)×410(D) mm

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CHAPTER 4

OfficeServ 7200 Functions

This chapter describes the functions of the OfficeServ 7200 relating to calls, VoIP, data, UMS, and web/system management.

1 Call Functions

The system processes station calls, trunk line calls, application calls and various signals through the PSTN and VoIP networking.

1.1 Dynamic IP Address Allocation

DHCP Client of the MCP

The MCP is the call processing control part of the OfficeServ 7200. The MCP uses the DHCP client function to get the IP address allocated by the data server and operate. In this case, the data server recognizes the MCP of the call server from the host ID and allocates the IP address specified in the DHCP allocation table. (The MCP can be operated using a fixed IP address, which is not the dynamic DHCP allocation method.)

MGI Configuration

The MGI can be alternatively operated by automatically receiving the dynamically allocated IP address from the data server then manually setting the IP address.

IP Phone Configuration

The IP phones or SIP (Session Initiation Protocol) phones registered to the system can be alternatively operated by receiving the dynamically allocated IP address from the data server then manually setting the IP address.

1.2 VoIP UMS Interface

Auto Attendant/Mailbox Interface

The OfficeServ 7200 uses SIP and RTP, the VoIP protocols, to provide the auto attendant and mailbox functions through the UMS and IP network operating in the feature server. To interface with the VoIP UMS, the MGI module should be mounted in the chassis slot of the OfficeServ 7200.

E-mail Notice

The system periodically checks whether any e-mails are received in the e-mail account registered to the UMS and notifies the result to the user by voice or through the LCD screen or LED of the phone. To be notified by voice, the user should set the TTS (Text-To-Speech) function.

1.3 SIP Server Interface

Standard SIP Phone Registration

The OfficeServ 7200 registers SIP phones which operate through the SIP interface to provide call process services according to the system-numbering plan. The user should install and operate the SIP server in the feature server.

Basic Call Processes of the Standard SIP Phone

The OfficeServ 7200 provides station and trunk line call services using the standard SIP phones registered to the OfficeServ 7200. Standard SIP phones do not provide all the functions of the keyphone system, only the basic station and trunk line call services.

Additional Call Processes of the Standard SIP Phone

The OfficeServ 7200 provides additional services related to station and trunk line call services using the standard SIP phones registered to the OfficeServ 7200. The additional services provided by the system are as follows:

- Call forwarding
- UMS mailbox services
- Group Ring (Parallel Forking): This function is available to the called party.

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1.4 Router ALG Interface

NAT Application Level Gateway (ALG)

When functions such as the VoIP signal process function and gateway function executed through the IP network in the OfficeServ 7200 are executed in the Network Address Translation (NAT) network, the conversion between the private IP address and public IP address should be performed. In this case, the call server and the data server interface with each other and share the information on the conversion between the private IP and public IP, which enables the system to provide services smoothly. Each IP address is translated automatically. This function operates only between the call server and data server.

Firewall ALG

When functions such as the VoIP signal processing function and gateway function executed through the IP network in the OfficeServ 7200 are executed in a network with a firewall, the system should be set to prohibit the firewall from cutting off the packets not manually but automatically for smooth firewall traversing. This function operates only between the call server and data server.

VPN ALG

When functions such as the VoIP signal process function and gateway function executed through the IP network in the OfficeServ 7200 are executed in the Virtual Private Network (VPN), the system should be set to prevent packet blocking during the IP address conversion due to tunnelling. In this case, the call server and data server interface with each other and share the tunnelling conversion information. This function operates only between the call server and data server.

2 VoIP Functions

VoIP functions indicate the functions executed in the SIP server. The SIP server is a software module operating in the feature server. The SIP server is based on the standard SIP protocol and provides the gateway function for smoothly processing signals between the existing phones and the standard SIP equipment. It also provides an interface function through which the standard SIP equipment can work with the phones.

2.1 VoIP Network

To communicate with another system through the VoIP networking, the MGI module must be installed. VoIP networking functions coincide with those of PRI/Q-SIG networking.

2.2 VoIP Trunk Line Interface

The OfficeServ 7200 provides the VoIP trunk line interface (H.323/SIP). The system controls calls and the private MGI module connects the speech path.

2.3 Proxy Server

The OfficeServ 7200 serves as the SIP equipment controller, interfacing the standard SIP equipment (user agent) defined in the RFC3261 SIP standard with the call services of the OfficeServ 7200. The OfficeServ 7200 uses the proxy server function to perform routing for call process requirements such as call setting, call cancel, and call termination through the SIP, which are received from the SIP equipment. The OfficeServ 7200 also manages the SIP equipment status and performs smooth call services between the SIP equipment.

2.4 User Registration

SIP interface users are identified by the SIP address in the e-mail format. This function saves and manages the current user's IP address after giving a priority to the IP address, then provides user information according to the valid user's demands.

2.5 SIP Telephone Configuration

The standard SIP telephone should be configured so that it can be used like any other telephone in the system. When entering the phone number and user ID of the standard SIP telephone in the call server, the configuration file corresponding to each SIP telephone is created in the IP server. When operating the SIP telephone, the required configuration data for the SIP telephone will be downloaded to the TFTP. The downloaded data includes the telephone number, user name, and the order information for the OfficeServ 7200 corresponding to the SIP telephone. This configuration data is used for setting the SIP telephone.

2.6 SIP Telephone Registration

When a standard SIP telephone is registered as a telephone in the system, the OfficeServ 7200 provides the call process services between SIP telephones, between an SIP telephone and a digital telephone, and between an SIP telephone and a PSTN trunk, by using the assigned telephone number.

2.7 Call Log

This records the information related to the call process performed in the SIP telephone. It is saved into a file, transmitted and managed in an external system management package.

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2.8 Forward Busy

The call server always monitors the SIP telephone status through the SIP server. If the ‘Forward Busy’ function is set, the incoming call is forwarded to the specified telephone number when a call is received by a busy SIP telephone.

2.9 Forward No Answer

If the ‘Forward No Answer’ function is set, the incoming call is forwarded to the specified telephone number when a call is not answered by the intended telephone.

2.10 Parallel Forking

If multiple SIP telephones are set to be used by one user in the SIP server and the priority of the call connection is the same, all assigned telephones will ring at the same time when the call is forwarded. When the call is answered on one of assigned telephones, the call will be connected and other ringing telephones will be disconnected.

3 Data Functions

The OfficeServ 7200 functions as a router, a switch, performs security functions, or serves as a data network application or data access interface (WAN, LAN, DMZ).

3.1 Switches

Unmanaged Switch

- The switch performs the function of the layer 2 Ethernet switch as well as the Learning Bridge function based on the MAC address filtering and forwarding algorithm.
- The switch supports the full duplex mode by 10Base-T/100Base-Tx auto detection and provides 16 switch ports per switch card.

802.1d Spanning Tree

The switch configures and processes the forwarding tree based on the spanning tree algorithm to prevent a packet-forwarding loop in the switch.

802.1p Packet Priority

The switch extracts the priority field from the Ethernet frame configured according to the 802.1p specification standard, and processes the frame according to the priority of the specified operation standard.

The packets are categorized into emergent packets and non-emergent packets and are then processed.

VLAN

The Virtual Local Area Network (VLAN) groups the related equipment by work group according to the LAN operational policy regardless of the location of the equipment. The VLAN also processes switching for the work groups. The VLAN removes the effects of unnecessary broadcasting packets and configures a stable switching subnet only for the corresponding group by separating and processing the group in the VLAN.

Accordingly, the switch can provide the differentiated QoS services and the VLAN can be configured based on the switch port and MAC address. The system automatically configures the VLAN for the IP telephone, signal process gateway, media gateway and UMS required for services, and performs the QoS process. The OfficeServ 7200 provides 32 VLAN groups.

IGMP Snooping

The L2 switch (located in the lower layer of the IP router) can process IGMP (Internet Group Management Protocol) messages to allow Multicasting to be used. This is referred to as IGMP Snooping.

The IP layer multicast group information included in the IGMP message is reflected in the MAC filtering database, its own switching database. The group information is processed in the MAC multicast address format mapped with the IP multicast address.

3.2 Routers

Network Interfaces

The OfficeServ 7200 provides the WAN1 and WAN2 network interfaces (which are connected to the WAN through an Ethernet interface), the serial network connected through the V.35 serial interface, and the LAN and DMZ network interfaces.

Static Routing

The OfficeServ 7200 configures a fixed routing table between each network interface to process the static routing. In this case, the routing table cannot be dynamically changed by the routing protocol, and specific routing services will be provided according to the pre-set routing policy.

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WAN Interface (Ethernet, PPPoE, DHCP Client)

The OfficeServ 7200 accesses the Internet through the WAN1 and WAN2 Ethernet WAN interface using the PPPoE and DHCP client protocols.

V.35 Interface (PPP, HDLC, Frame Relay)

The OfficeServ 7200 accesses the Internet through the V.35 serial interface with a transfer speed of up to 2Mbps. In this case, the system supports various environments using functions such as PPP, HDLC and Frame Relay Encapsulation.

Subnet Routing

The WAN1, WAN2, LAN, and DMZ network interfaces are configured with different sub-network interfaces, enabling them to perform the routing process with each other.

Routing Protocol

The OfficeServ 7200 supports the routing information-exchanging protocol to react to network environmental change and to effectively process the routing.

- RIPv1, RIPv2
  These protocols are widely used for managing the routing information in a middle-sized independent network such as a group of LANs.

- OSPFv2
  This routing protocol is used prior to the RIP in a large-sized independent net work. A router detects and reports any change in the routing table or the network to other routers. In this way, all routers share the same routing information.

IGMPv2 Interface

- This Internet protocol enables an IP terminal or an Internet computer to report multicast groups to nearby routers. The multicasting allows a host computer to send the contents to pre-specify other IP terminals or Internet computers.
- Multicasting is used for modifying the address books of mobile computer users at the site, sending the company's documents according to the distribution list, setting the multicast membership group and broadcasting the broadband width-program of the streaming media to the audience tuning into the received wave length.

Routing Between VLAN Groups

Communication between the VLAN groups is done through routing between the groups.

CBQ/BoD (Bandwidth on Demand)

The queuing process is differentially performed according to the level table where the routing process priority for a data server is defined.

RTP Priority

The RTP (Real-Time Transport Protocol) packet is a VoIP media packet. The queuing process for the RTP packet is prior to that of other data packets, which helps to maintain the tone quality. This function is useful when using the VoIP function in the network where the VoIP packet that should be processed in real time and other packets for general office work are mixed.

IP-ToS Process

This function checks the ToS (Type of Service) field of the IP header and processes it according to priority of the corresponding routing in the data server. This function reproduces the ToS field flowing into the data server, performs the routing process first of all, and heightens the process priority in the next HOP.

3.3 Security

NAT/PT (In/Out/Exclusive/Redirect)

The security function supports the conversion function between the private IP address and public IP address in the network where security is required. The Inbound, Outbound, Exclusive, and Redirect functions are supported.

- Inbound: This function performs the forwarding process for the packet flowing from the WAN to the IP and port of the LAN specified in the NAT/PT conversion table.
- Outbound: This function converts the IP address of the transmitter into the global IP address according to the NAT/PT conversion table for transmitting the packet from the LAN to the WAN.
- Exclusive: This function is used for the IP address that is not applied by the NAT/PT conversion.
- Redirect: When the DNS server IP in the data server management sector is changed, each IP terminal uses the pre-DNS IP and this function changes the DNS IP by registering the post-DNS IP into the Redirect table.

Firewall

- Access filtering
  This function prevents access to disallowed IP addresses to control the access for the resource non-disclosed to the outside and to control the external re source which the membership in the LAN may access.

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- DMZ function
  This function is used for connecting the web server and mail server (which are firewall-protected LAN networks but need to be freely accessed from the outside) to the subnet separated from the LAN network where firewall blocking is not applied. In this way, access from the outside can be smoother with the access control service through the firewall.

- Port Forwarding
  This function is almost the same as the DMZ function but is used for connecting to a specific network without a separately divided DMZ port. This function is used for the extra network services as well as the DMZ function. The extra network is configured for a party outside of the office to access the Intranet in the office via the Internet. In this network, security on the Intranet is paramount.

Intrusion Detection System (IDS)

This function monitors the packets on the network and detects those which can damage network operation, thus making the network more stable. The IDS is divided into various types from a detection type, where a specific-type attack is detected, to the abnormal traffic detecting type, which is based on the Snort Rule (www.snort.org) defining the intrusion pattern and types. The detected packets are sorted and processed into close connection/port or service disable/Alarm/log based on the intrusion pattern and the level. In the case of an alarm, the system will immediately notify the system administrator.

Virtual Private Network (VPN)

- VPN function
  The system provides the virtual private network function using the Internet open network. T he VPN gateway function is based on the IPSec (IP Security), which is used to build the enterprise network with reduced cost and enforced security.

- VPN Transparent Mode
  The data server operates as a VPN client and establishes a VPN channel to remote VPN equipment for data transmission. This mode provides the interface between each OfficeServ 7200 based on the IPSec and the 3DES and RSA coding functions.

- VPN Tunnel Mode
  VPN functions are processed by establishing a tunnel through the VPN gate ways between the OfficeServ 7200 data servers. Up to 100 VPN channels are available for one VPN.

3.4 Data Applications

DHCP

The OfficeServ 7200 can assign the IP address as a DHCP server. When using the DHCP server in another subnet, the OfficeServ 7200 operates as a DHCP relay. The IP addresses of the IP equipment connected to the OfficeServ 7200 can be easily managed.

SIP Aware ALG (SIP Application Gateway)

This function is used for re-creating packets for smooth communication by checking the SIP signal process packets according to the NAT/PT table in the data server. When using the data server, SIP equipment can operate regardless of the packet blocking caused by the firewall or the MAT/PT conversion.

Outside ALG Interface

This function enables the outside application to retrieve or control information such as the NAT/PT conversion information, firewall-blocking information, and the VPN tunnel information processed in the data server. This function allows the control packets, which are used for H.323, VoIP networking and IP telephones operating in the Call server, to be smoothly serviced without blocking.

System Management Interface

This function allows the administrator to report and manage alarms, events, traffic and logging information, including IDS information from the data server, in the system administrator package via the TCP/UDP. Reporting can be optionally specified based on the management data type.

Management Function

This function is used for configuring the data server function with CLI (Command Line Interface) on the Telnet. The user can configure and view the operation of the data server functional block using a web browser.

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4 UMS Functions

The OfficeServ 7200 provides the Unified Messaging System (UMS) functions such as auto answering, voice messaging and integrated e-mail message management.

The VoIP-UMS processes the call signal using the VoIP module, which has the SIP protocol for the interface to the voice switch, and transmits the media through the RTP protocol of the TCP/IP. Accordingly, the OfficeServ 7200 has superior architecture for capacity expansion and is cost effective, since there is no need for the physical interface required for the existing UMS or VMS.

4.1 Auto Attendant

Announcement Replay and Auto Call Forward

- This system replays an announcement when a calling party is connected to the auto attendant. This announcement can be specified based on holidays, working hours or non-working hours.
- The auto call forward connects the calling party to the desired subscriber's station when the calling party dials a station number in the auto attendant. In this case, the call routing function will be also provided, which detects whether the entered phone number is valid or detects that the length of the phone number can be changed.

Announcement Auto Change Based on the Schedule

This function allows the administrator to automatically change and replay the announcement based on holidays, working hours and non-working hours.

Announcement Change by Telephone

This function allows the administrator to change the announcement by interfacing with the auto attendant from a remote site.

Call Forwarding to the Mailbox on the Busy Line

When a party interfaces to the auto attendant and tries to connect a call to a busy station, the called party on the busy station can use this function to forward the call to a voice mailbox.

Queuing Process on the Busy Line

When a party interfaces to the auto attendant and tries to connect a call to a busy station, the message 'Please hold on because the line is busy now' is played and the

connection is re-attempted for a specific time (provided the 'Call Forward to the Mailbox for a Busy Line' function is not set). If the line continues to be busy after the maximum queuing time, a voice message is provided asking the user whether to forward the call to their voice mailbox or disconnect the call.

Direct Connection to the Mailbox

This function allows a user to access the auto attendant and directly connect the call to the mailbox of a specific user rather than trying to call the subscriber's station.

Time Control for the Announcement

This function allows the administrator to control the maximum input time for an announcement when the administrator directly records an announcement for the auto attendant.

Cutting off Announcements when Digits are entered

If the user enters the target station number when the voice announcement is played in the auto attendant, the system stops the announcement and processes the entered digits.

Announcement Replay

This function allows the administrator to listen to pre-recorded multiple voice announcements on a specific telephone.

4.2 General Functions Related to Voice Mail

Subscriber Authentication and Auto Login

- When a subscriber tries to log in to their mailbox, the subscriber authentication function checks the password to prevent unauthorised access. In this case, the mailbox number and password are entered and checked in turn.

- When a caller directly connects a call to the mailbox using the key number of the mailbox on the station phone, the system uses the auto login function to require only the password, without the mailbox number, since the UMS server knows the caller's phone number. The user can enter their mailbox number and connect a call to their mailbox by using the hot key (speed key) on the telephone.

Voice Message Record/Replay/Store/Delete/Re-Send/Reply

- A caller can make a call to the mailbox of the called party and leave a voice message. The caller can send the message at a specific time (Send reservation) or listen to their recorded message and re-record it.

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- A subscriber can log in to their own mailbox to listen to voice messages including the message recording time, calling number, and caller ID. The subscriber can delete the message, send it to another party or group, or reply to the message after listening to it.
- The subscriber can delete all messages currently stored in the mailbox.

Voice Message Pause/Play Continue/Next Play/Previous Play/Play Again

The user can pause and replay the current message, play the next or previous messages, or play the current message again.

New Message Auto Replay

The user logged in to the mailbox can optionally set whether to automatically replay new voice messages.

Setting the Maximum Message Number for a Mailbox

This function is used for specifying the maximum message number for a mailbox. The number of messages in the mailbox cannot exceed the specified number. The corresponding announcement is provided.

Setting the Maximum Time for Storing Messages

The system automatically deletes voice messages after a specific time if the user does not delete the message after listening to it. The user can specify the time for auto message deletion.

Setting the Maximum Message Length

The message length is limited. Therefore, if the user records a message for a specific time, the recording is automatically completed and a voice announcement is provided saying ‘Message recording is completed’.

Announcement Change based on the Schedule

This function automatically changes and provides the announcement based on holidays, working hours or non-working hours.

Voice Message Notice

A new voice message is notified to the user on the LCD screen or via an LED on the user’s telephone.

Private Mailbox Management

The user can record/listen to/delete the name of the private voice mailbox or change the password. The user can also record/listen to/delete the private voice mailbox greeting

4.3 Additional Functions Related to Voice Mail

Answering Machine Emulation (AME)

This function is almost the same as that of the auto answering machine. If a called party does not answer the call, it is forwarded to AME. The called party can listen to the forwarded call or reply to the call using the functional key.

Call Back to the Caller ID/Call Number

This function allows users to call back to the Caller ID or called number (a telephone number left with a voice message).

Voice Message Notification

The UMS directly connects the voice message to the subscriber's station then notifies the message on the LCD screen or the LED of the phone when a new voice message arrives. The user can optionally listen to the new message by picking up the handset.

Call Record

This function allows users to record the contents of the call in the user's voice mailbox during the call. The digital phone has a hot key for recording. Since an analogue phone does not have a hot key, the user should log in to the web and click the corresponding button to use this function.

Private Voice Memo

This function allows users to memorize information such as a schedule or telephone number by voice. This function is usually the same as the general voice message function although the voice memo can be separately managed.

Stop the Private Mailbox Function

This function allows users to stop the private mailbox function. If a party tries to access the prohibited mailbox, a message will be displayed notifying that this mailbox cannot be used.

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4.4 General Functions Related to E-mail

Inbox

This function allows users to read stored mail.

- List View
  Allows users to view the list of mail stored in the Inbox. The functional button is displayed only when two frames are selected as ‘mail reading frame’ when setting the environment.

- Modify
  Allows users to modify and forward read mail. The functional button is displayed only in the Draft Folder.

- Reply
  Allows users to reply to read mail.

- Forward
  Allows users to forward the currently read mail to another user.

- Delete
  Allows users to forward read mail to the Deleted Folder. Mail is permanently deleted by moving into the Deleted Folder and selecting the ‘Delete’ function.

- Reject Receipt
  Allows users to reject mail from the sender of the currently read mail. If the Reject Receipt button is clicked, a message will be displayed notifying that the address of the sender of the currently read mail is added to the Receipt Reject list.

- Transfer the Mail to Another Box
  Allows the users to forward the read mail to another box. The functional button is not displayed in the Draft Folder since the mail stored in the Draft folder cannot be transferred to other boxes.

Compose

This function allows users to write or send mails.

- To:
  Enter the address of the receiver in this field. Up to six addresses can be entered. When entering multiple addresses, enter a comma between each address. (e.g. : abcd@samsung.co.kr, efgh@samsung.co.kr). If the address of the receiver has been registered, click the address from the address list to select.

- Cc:
  Enter the addresses of those to receive copies of the mail. Up to six addresses can be entered. Refer to the ‘To’ field above for entering addresses.

- Subject
  Enter the subject of the mail. Up to 128 characters can be entered.

- Text
  Write the text of the mail. Up to 2 Gb is available for a mail.

- Original Text
  This function displays the text of the originally received mail. This is displayed only when replying to the original mail or transferring the original mail.

- Attachments
  Specify the number of files to append. Up to 10 files can be appended and the capacity is unlimited. Enter the number of files to append and click the button. A message will be displayed asking the user to select the appended file.

- Attachment 1
  Enter the target file name in the empty field or click the ‘Find’ button to select a file saved in the PC.

- Copy Message to ‘Sent Folder’
  Allows users to store the sent mail in the ‘Sent Folder’.

- Append Signature
  Allows users to send mail with their signature appended. The server administrator can specify the signature when creating a mail account. The account user can later change the signature. To change the signature, click the corresponding button.

- Send
  Allows users to send mail.

- Save Draft
  Allows users to temporarily store mail in a Draft while writing. The user can modify the contents of the mail in the Draft.

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Deleted Folder

Allows users to temporarily store deleted mails. If the user deletes the mail stored in the Deleted Message folder, the mail will be permanently deleted.

Draft

Allows users to temporarily store a mail while writing.

Mailbox List

Allows users to manage their private mailbox lists such as the Inbox, Sent Items, Deleted Items and Draft folders.

Mailbox Creation

- Specify the name of a newly created mailbox. The name can have up to 32 characters.
- Enter the name in the ‘Create New Mailbox’ field and click ‘Add’. Then verify that a message notifying that the mailbox is correctly created is displayed and the name is displayed in the ‘User Mailbox’ list on the upper part of the screen.

Mailbox Change/Removal

Allows users to change or delete the existing mailbox.

Address List

Allows users to create the address list by saving frequently used addresses.

- Select Group
  Allows users to select an address group for changing the name or deleting the address.

- Change Group Name
  Allows users to change a group name.

- Delete Group Name
  Allows users to delete a group name.

- Select All
  Allows users to select all addresses from the address list. If this function is enabled, all the addresses will be checked.

- Selection Cancel
  Allows users to cancel the address selection. If this function is enabled, the checked addresses will be unchecked from the address list.

- Delete Address
  Allows users to delete an address. To delete an address, select the target address and click the ‘Delete’ button.

- Transfer Address
  Allows users to change the address group.

- Add Address
  Allows users to add new addresses. If this item is clicked, a separate window will be displayed.

- A~Z
  Allows users to retrieve an address staring with a specific character from the address list.

External Mail Importing

- The user can import mail from other accounts into the mail account of the OfficeServ 7200. For instance, if the user already has a mail account on a site such as ‘Yahoo’ or ‘Naver’, they can read the mail for the corresponding site in their OfficeServ 7200 mailbox by registering the site in the ‘External Mail Management’ item.

- External mail address
  Enter the external mail address to register (e.g. jjkim@yahoo.co.kr).

- External mail server name
  Enter the external mail server name to register (e.g. yahoo.co.kr).

- User ID
  Enter the user ID to access an external mail (e.g. jjkim)

- Password
  Enter the password to access an external mail.

- Protocol
  Select the protocol type for the external mail server. To find the protocol type, access the corresponding server.

- Leaving the original message
  The user can leave the original message in the external mail account when setting an external mail to be read in the current mail account. To execute this function, Select ‘Yes’.

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Mail Receipt Rejection

- The user can register the corresponding mail ID to automatically cut off undesired mail such as junk mail. The system automatically rejects the mail receipt.

- Enter the e-mail address for mail receipt rejection (e.g. sago@shopping.com).

Mail Filtering

- When a new mail arrives, the system sorts it according to a specific word selected such as the sender name, receiver name, notice, or subject and then sends it to a separate mailbox.

- Filter addition
  The user can set a mail that includes a specific word selected such as the sender name, receiver name, notice, or subject to be stored in a specific mailbox.

SMTP Sending Interface

The system supports the SMTP (Simple Mail Transfer Protocol) as an E-mail sending protocol.

POP3 Receive Interface

The system supports POP3 (Post Office Protocol 3) as an E-mail receiving protocol.

IMAP4 Receive Interface

The system supports IMAP4 (Internet Message Access Protocol version 4) as an E-mail receiving protocol.

Web Mail Interface

The system provides the user and administrator with services for e-mails via the web browser.

4.5 Additional Functions Related to E-mail

User Account Management

The administrator can retrieve or delete an E-mail user account and register a new user.

Mailbox Capacity Management

The system can restrict the storage capacity of a mailbox and display an alarm signal when the assigned capacity is exceeded.

Notice Management

The E-mail user can register or change the notices in their work group.

Logo Management

The user can register or change a screen from the screens in their work group for the web login screen.

4.6 Integrated Messaging

Converting Voice Mails to E-mails

When a new voice mail arrives, the system converts it into a file format such as WAV, MP3, or OGG and appends the converted voice mail to an e-mail.

New E-mail Notice

This function notifies the user of a new e-mail arrival on the LCD screen of the digital phone or via an LED. The UMS (Unified Messaging System) optionally dials the user's station to notify that a new e-mail has arrived.

Reporting and Playing New E-mails

When a new e-mail arrives, the UMS dials the user's station and reports the mail using the TTS (Text-To-Speech) function.

- Mail information includes the number of total mails and the number of new mails. The user can listen to the list of the mail subjects or the text of a mail.

- The user can log in to their mailbox and listen to their mail with their mailbox key number.
- If the e-mail is in HTML format, the system extracts the text of the mail to report it using the TTS.

4.7 UMS Management

Database Backup and Recovery

The user can backup or recover the UMS (Unified Messaging System) database operating in the OfficeServ 7200.

- For backup, the database should be compacted as a file into a specific directory. This compacted database can be downloaded to an external PC.

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- There are two types of backup:
  Auto backup - the system automatically executes the backup periodically.
  Manual backup - the user can back up on the web when needed.

Mailbox Management

The mailbox administrator can add or delete mailboxes. This function can be executed on a telephone. The mailbox administrator can retrieve the mailbox information on the web.

Voice Text Upload/Download

The audio text used as the announcement for the system can be uploaded / downloaded to/from the external PC to/from the system,.

Alarm Information Management

The user can specify the alarm level (Major and Minor) for alarms in the UMS and view alarm information.

Operational Information Management

The user can view information such as the currently busy channel status and web login history.

Voice CODEC Selection

The user can specify the CODEC format for the voice files of the OfficeServ 7200.

- The user can select the voice CODEC (WAV, MP3, OGG) to be appended when sending mails.
- The user can select the voice CODEC (G.726, G.729) to be appended when creating the TTS.

5 Web/System Management

The OfficeServ 7200 provides a user interface that manages various functional blocks of the system on the web through a web browser. The system performs the call server configuration management and information retrieving function through the PCMMC package. It also monitors the operational status of the functional blocks in the system.

5.1 Web Management

Database Backup

The user can back up the database for the data server and feature server through the web. (The database for the call server cannot be backed up.) Since the database backup is actually executed in the feature server, the user can use regular menus only when the feature server operates.

Follow the steps below to perform backup, download, upload, and restore functions.

- Back up the database file in the /home/dbbackup directory on the feature server.
- The name of the backed-up file should be in the ‘module name_date_hour.tar’ format (e.g. /home/dbbackup/MS_20030620_145632.tar).
- Collect the MS_*.tar, US_*.tar, SS_*.tar, and DS_*.tar files in the /home/database directory in one ‘tar’ file and transmit it to the web client (e.g. FSDB_20030620_142310.tar).
- Upload the database file of the web client to the feature server.
- Restore the database file in the /home/database directory of the feature server to the system.

User Information

The user can view user names and e-mail IDs of each station number. The mailbox number is the same as the corresponding station number. If a user forgets their password, the administrator can reset it to the default. (The default password is the phone number.)

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Server Information

The user can view the information (IP address, web port, IPC port) on each server module (call server, data server, feature server, system administrator) through this function.

VoIP Web Administrator

This function displays or changes the setting status for VoIP services.

Data Web Administrator

This function displays or changes the setting status for data services.

Voice-Mail Web Administrator

This function displays or changes the setting status for voice-mail services.

E-Mail Web Administrator

This function displays or changes the setting status for e-mail services.

5.2 System Management

Multi-Site Management

The user can enter and manage information on the site where the OfficeServ 7200 is installed (addresses, phone numbers, notes, system installation date, administrator, etc.)

Integrated System Management

The user can view the current status of the system in real time (operational status, alarm information, etc). The user can collectively manage each functional block (call server, data server, or feature server) by running the PCMMC package or connecting the web servers of the corresponding server.

Configuration Management

The configuration information for the OfficeServ 7200 can be displayed. The configuration information is as follows:

- OfficeServ 7200 unit configuration
- OfficeServ 7200 version information
- Data function setting/version information
- NAT information
- Feature server (SIP, UMS, mail) function setting/version information

Event Management

This function displays the various event information in the OfficeServ 7200 such as critical errors, warnings, etc.

Access Log Management

This function displays the access log for the OfficeServ 7200. The user can group each access log using the arranging and searching function.

Traffic Management

The user can view traffic information (telephone usage, the amount of the data transmitting and receiving, VoIP call process, mail transmission/receive) generated in the OfficeServ 7200 for a specified time using this function. This information can be used as statistics for a specified period.

Call Detail Record Management

The Call Detail Record (CDR) serviced in the OfficeServ 7200 can be saved and viewed.

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ABBREVIATIONS

A

AAA	Authentication, Authorization and Accounting
AC	Alternating Current
ALG	Application Level Gateway
AMI	Alternate Mark Inversion
AOM	Add-On Module
AP	Access Point

B

BRI	Basic Rate Interface

C

CA	Call Agent
CID	Caller Identification
CR Mode	Constant Resistance Mode
CSU	Communication Service Unit
CTI	Computer-Telephony Integration

D

DASL	Digital Adaptor for Subscriber Loop
DC	Direct Current
DECT	Digital Enhanced Cordless Telecommunications
DGP	Digital Phone
DHCP	Dynamic Host Configuration Protocol
DLI	Digital Line Interface
DSU	Data Service Unit

E

EMI	Electro-Magnetic Interference

F

FXO	Foreign Exchange Office
FXS	Foreign Exchange Station

G

GARP	Generic Attribute Registration Protocol
GK	Gatekeeper
GVRP	GARP VLAN Registration Protocol

H

HDLC	High level Data Link Control
HLR	Home Location Register
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol

I

ID	Identification
IDS	Intrusion Detection System
IGMP	Internet Group Management Protocol
IMAP	Internet Messaging Access Protocol
IN-SCP	Intelligent Network Service Control Point
IP	Internet Protocol
IPC	Inter-Processor Communication
IPDC	Internet Protocol Device Control
IP-SCP	Internet Protocol Service Control Point
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part

J

JDBC	Java Database Connectivity

K

KDB	Keyset Daughterboard

L

LAN	Local Area Network
LCD	Liquid Crystal Display
LCP	Local Control Processor
LED	Light Emitting Diode
LIM	LAN Interface Module

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M

MCP	Main Control Processor
MEGACO	Media Gateway Control
MG	Media Gateway
MGC	Media Gateway Controller
MGI	Media Gateway Interface
MGCP	Media Gateway Control Protocol
MMC	Man Machine Communication
MPD	Metering Pulse Detection
MOH	Music On Hold
MUA	Mail User Agent
MTA	Mail Transfer Agent

N

NAT	Network Address Translation

O

OSPF	Open Shortest Path First

P

PAT	Port Address Translation
PBA	Printed circuit Board Assembly
PCM	Pulse Code Modulation
PCMMC	PC-based Man Machine Communication
PLL	Phase Locking Loop
POP3	Post Office Protocol version 3
PPP	Point-to-Point Protocol
PPPoE	Point to Point Protocol over Ethernet
PRI	Primary Rate Interface
PRS	Polarity Reversal Signal
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit

Q

QoS	Quality of Service
Q-SIG	Q-Signalling

R

RIP	Routing Information Protocol
RTCP	Real-time Transmission Control Protocol
RTP	Real-time Transmission Protocol

S

SCP	Signal Control Processor
SDP	Session Description Protocol
SG	Signalling Gateway
SGCP	Simple Gateway Control Protocol
SIGTRAN	Signalling Transport
SIP	Session Initiation Protocol
SLI	Single Line Interface
SLT	Single Line Telephone
SMTP	Simple Mail Transfer Protocol
SoL	Server optimized Linux
STA	Spanning Tree Algorithm
STP	Signalling Transfer Point

T

TCAP	Transmission Control Application Part
TCP	Transmission Control Protocol
TEPRI	T1E1PRI
TRK	Trunk

U

UA	User Agent
UAC	User Agent Client
UART	Universal Asynchronous Receiver and Transmitter
UAS	User Agent Server
UCD	Uniform Call Distribution
UDP	User Datagram Protocol
USB	Universal Serial Bus

V

VAD	Voice Activation Detect
VLAN	Virtual LAN
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network

W

WAN	Wide Area Network
WIM	WAN Interface Module
WLI	Wireless LAN Interface

X

xDSL	x-Digital Subscriber Line

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